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Energy Research Abstracts

Abstracts 47142-49643

Office of Scientific & Technical Information
UNITED STATES DEPARTMENT OF ENERGY

CURRENT AWARENESS PUBLICATIONS ON ENERGY

To provide complete coverage of literature related to major Department programs, announcement publications that are comprehensive in their coverage of certain energy fields are issued regularly. All information in these publications, plus additional backup information, is included in the Energy Data Base of the Office of Scientific and Technical Information; all references are also available for machine searching via the on-line retrieval system, DOE/RECON, and the commercial on-line retrieval systems. Descriptions of these current awareness publications, which are supported either directly or indirectly by the DOE, appear below. Department of Energy components may receive the listed publications free from the Office of Scientific and Technical Information, U. S, Department of Energy, P. O. Box 62, Oak Ridge, TN 37831. Telephone (615) 576-1301; FTS 626-1301.

PUBLICATIONS OF THE OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION

Energy Abstracts for Policy Analysis (EAPA)

A monthly abstract journal devoted to the analysis of energy research, conservation, and policy. Scope and coverage are limited to substantive articles or reports and emphasize legislative, regulatory, and other legal aspects, as well as social, economic, and environmental impacts. *EAPA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The annual subscription price is $72.00 for domestic (North America) or $90.00 for foreign (outside North America) subscribers; a single issue is $5.00 or $6.25, respectively.

Energy Research Abstracts (ERA)

A comprehensive semimonthly abstract journal devoted to all areas of energy-related information produced by the Department of Energy, other U. S. government organizations, and foreign governments. *ERA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The annual subscription price for the 24 issues is $146.00 for domestic (North America) subscribers or $182.50 for foreign (outside North America) subscribers. A single issue is $14.00 or $17.50, respectively.

DOE Patents Available for Licensing (PAL)

DOE is prepared to grant exclusive or nonexclusive, revocable licenses under DOE-owned U. S. patents and patent applications; this semiannual publication provides abstracting and indexing coverage of this literature. *PAL* is available (use PB86-946800) from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. The annual price is $18.00 for domestic (North America) or $36.00 for foreign (outside North America); a single issue is $9.00 or $18.00, respectively.

Energy Meetings (EM)

A monthly listing of conferences, symposia, workshops, etc., pertaining to DOE's programmatic interests. *EM* is available on subscription (use PB86-901500) from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. The annual subscription price is $45.00 for domestic subscribers and $90.00 for subscribers outside the North American continent; a single issue is $5.00 and $10.00, respectively.

The following monthly update journals are available to the public on subscription from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; use the identifying order number (PB- No.) when subscribing. The annual subscription price (12 issues plus cumulative index) is $85.00 for domestic (North America) and $170.00 for foreign (outside North America) subscribers; a single issue is $8.00 and $16.00, respectively.

Current Energy Patents (CEP)–**PB86-902800.** International patent literature, including patent applications, on any aspect of energy production, conservation, and utilization.

Energy and the Environment (EAE)–**PB86-914900.** Impacts of energy-related activities and radioactive and nonradioactive pollutants on the environment.

Fossil Energy Update (FEU)–**PB86-914600.** The exploration, development, processing, and use of fossil fuels.

Fusion Energy Update (CFU)–**PB86-915300.** Information on controlled thermonuclear fusion, including plasma and fuel research and power plant engineering and conceptual design studies.

Solar Energy Update (SEU)–**PB86-914500.** The utilization of solar energy, including biomass and tidal and wind power.

The following semimonthly bulletins are also available from the National Technical Information Service. The annual subscription rate for one volume (calendar) year (24 issues; no indexes) is $45.00 for domestic (North America) and $90.00 for foreign (outside North America) subscribers; use the identifying order number (PB- No.) when subscribing.

Acid Precipitation (APC)–**PB86-901000.** Acid precipitation, including effects and possible control measures.

Buildings Energy Conservation (BEC)–**PB86-900700.** Technology required for energy conservation in buildings of all types.

Coal-Based Synfuels (CBS)–**PB86-901400.** Conversion of coal into gaseous or liquid fuels.

Coal Combustion and Utilization (CCU)–**PB86-914400.** Coal combustion, including fluidized bed combustion, and direct utilization of coal for power generation, fuel cells, and MHD generators.

Coal Preparation and Pollution Control (CPC)–**PB86-900800.** Coal preparation and cleaning and reducing pollution from its direct combustion.

Direct Energy Conversion (DEC)–**PB86-946600.** Photovoltaics, magnetohydrodynamics, electrohydrodynamics, thermoelectrics, thermionics, and fuel cells.

Energy from Biomass (EFB)–**PB86-900600.** Biomass production, conversion, and utilization for energy.

Geothermal Energy Technology (GET)–**PB86-914700.** Exploration, development, and utilization of geothermal resources.

Heavy-Ion Reactions (HIR)–**PB86-900500.** Heavy-ion (A > 4) reactions.

Laser Research (LAR)–**PB86-901100.** Laser research and development, excluding applications.

Nuclear Fuel Cycle (NFC)–**PB86-913400.** Both front and back ends of the nuclear fuel cycle.

Nuclear Reactor Safety (NRS)–**PB86-913500.** Accident analysis, safety systems, radiation protection, decommissioning and dismantling, and security measures.

Radioactive Waste Management (RWM)–**PB86-902900.** Management aspects of transport and storage, waste processing, waste disposal, waste storage, radioactive effluents, and shipping containers.

Solar Thermal Energy Technology (STT)–**PB86-901200.** Research and development of efficient and reliable solar thermal conversion systems.

Transportation Energy Research (TER)–**PB86-900900.** Energy-efficient advanced automotive propulsion systems and transportation energy conservation.

Unconveational Petroleum (UCP)–**PB86-901300.** Secondary and tertiary recovery of petroleum and oil shales and tar sands.

INTERNATIONAL ENERGY PUBLICATIONS

The Office of Scientific and Technical Information (OSTI) cooperates in the publication of international abstract journals with the following: (1) International Atomic Energy Agency, International Nuclear Information System, Vienna, Austria, for *Atomindex;* (2) International Energy Agency, Biomass Conversion Technical Information Service, Dublin, Ireland, for *Biomass Abstracts;* and (3) International Energy Agency, IEA Coal Research, London, England, for *Coal Abstracts.* In each case, the cognizant foreign agency provides the non-U. S. information to OSTI for inclusion in the Energy Data Base; in turn, OSTI provides the U. S. information for input into the respective journal.

Atomindex

A semimonthly abstract journal providing worldwide coverage of information on nuclear science and technology. *Atomindex* is available by subscription from UNIPUB, 345 Park Avenue South, New York, NY 10010. The cost of an annual subscription, 24 semimonthly issues and semiannual and annual cumulative indexes, is $290.

Biomass Abstracts

A bimonthly abstract journal with comprehensive coverage of information on the conversion of biomass to energy. *Biomass Abstracts* is available free to DOE components and contractors from OSTI. Non-DOE organizations may obtain *Biomass Abstracts* from Biomass Conversion Technical Information Service, Institute for Industrial Research and Standards, Ballymun Road, Dublin 9, Ireland, for 42 IR pounds per year. Make checks payable to the Institute.

Coal Abstracts

A monthly abstract journal providing comprehensive worldwide coverage of information in the field of coal science and technology. *Coal Abstracts* is available to DOE components and contractors from OSTI. Non-DOE organizations may obtain *Coal Abstracts* from IEA Coal Research, Technical Information Service, 14-15 Lower Grosvenor Place, London SW1W 0EX, England, for 100 pounds sterling per year.

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ENERGY RESEARCH ABSTRACTS

ABOUT THE OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION

The Office of Scientific and Technical Information (OSTI) in Oak Ridge, Tennessee, has been the national center for scientific and technical information for the Department of Energy (DOE) and its predecessor agencies since 1946. In developing and managing DOE's technical information program, OSTI places under bibliographic control not only DOE-originated information but also worldwide literature on scientific and technical advances in the energy field and announces the source and availability of this information. Whereas the literature of science is emphasized, coverage is extended to DOE programmatic, socioeconomic, environmental, legislative/regulatory, energy analysis, and policy-related areas. To accomplish this mission, OSTI builds and maintains computerized energy-information data bases and disseminates this information via computerized retrieval systems and announcement publications such as abstracting journals, bibliographies, and update journals. Direct access to OSTI's most comprehensive data base, the Energy Data Base, is available to the public through commercial on-line bibliographic retrieval systems. The Energy Data Base and many of OSTI's energy-related data bases are available to DOE offices and contractors and to other government agencies via DOE/RECON, the Department's on-line information retrieval system. The Office of Scientific and Technical Information has developed and maintains systems to record and communicate energy-related research-in-progress information, to maintain a register of DOE public communications publications, to track research report deliverables from DOE contractors, and to test and make available DOE-funded computer software programs with scientific and management applications; OSTI also serves as adviser for special publication needs of the Department. To effectively manage DOE's technical information resources, OSTI's program is one of continual development and evaluation of new information products, systems, and technologies.

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ABOUT *ENERGY RESEARCH ABSTRACTS*

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs originated by the U. S. Department of Energy, its laboratories, energy centers and contractors. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations. The user should remain aware that *ERA* coverage of non-report literature is limited to that generated by Department of Energy activity.

ERA is comprehensive in its subject scope, encompassing the DOE's research, development, demonstration, and technological programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

ERA is available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Inquiries should be directed to the Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, TN 37831.

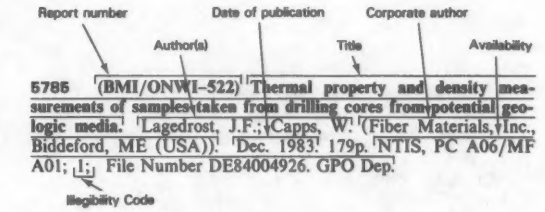
ERA is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $146.00 for domestic subscribers and $182.50 for foreign subscribers. A single issue costs $14.00 (domestic) or $17.50 (foreign). The cumulative indexes will be available in printed form from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The GPO Stock Number is 061-000-00675-3 and the price is $124.00 for the Vol. 10 indexes. The cumulative indexes are also available in microfiche form from the National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161, and from Engineered Systems, P. O. Box 866, Oak Ridge, TN 37831.

Office of Scientific and Technical Information
United States Department of Energy, P. O. Box 62, Oak Ridge, TN 37831

HOW TO USE *ENERGY RESEARCH ABSTRACTS*

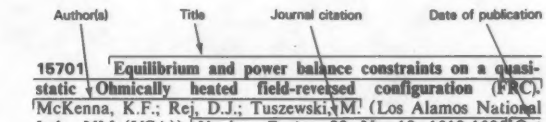
ABSTRACTS IN *ENERGY RESEARCH ABSTRACTS*

The principal elements of abstract entries for a typical research and development report and a typical technical journal article are illustrated below.



5785 (BMI/ONWI-522) Thermal property and density measurements of samples taken from drilling cores from potential geologic media. Lagedrost, J.F.; Capps, W. (Fiber Materials, Inc., Biddeford, ME (USA)). Dec. 1983. 179p. NTIS, PC A06/MF A01; 1; File Number DE84004926. GPO Dep.

Abstract: Density, steady-state conductivity, enthalpy, specific heat, heat capacity, thermal diffusivity and linear thermal expansion were measured on 59 materials from core drill samples of several geologic media, including rock salt, basalt, and other associated rocks from 7 potential sites for nuclear waste isolation. The measurements were conducted from or near to room temperature up to 500°C, or to lower temperatures if limited by specimen cracking or fracturing. Ample documentation establishes the reliability of the property measurement methods and the accuracy of the results.



15701 Equilibrium and power balance constraints on a quasi-static, Ohmically heated field-reversed configuration (FRC). McKenna, K.F.; Rej, D.J.; Tuszewski, M. (Los Alamos National Lab., NM (USA)). *Nuclear Fusion;* **23:** No. 10, 1319-1325 (Oct 1983).

Abstract: Zero-dimensional power balance calculations are performed for a quasi-static, purely Ohmically heated field-reversed configuration. Without compression, the constraint imposed by radial pressure balance limits the power input. Estimates of the energy loss from impurity line radiation as well as from classical and anomalous transport are given. Effects of cold puff gas injection are also investigated.

INDEXES TO *ENERGY RESEARCH ABSTRACTS*

Five indexes are provided for approaching the contents of each issue of *Energy Research Abstracts (ERA).* Each index is preceded by an introduction that details the organization of the index and the principles by which it was compiled. The reader is referred to these introductions for information not found in the index examples that follow.

• Corporate Author Index

Technical report literature is indexed using the name of the organization or institution responsible for the issuance of the report.

5785 (BMI/ONWI-522) Thermal property and density measurements of samples taken from drilling cores from potential geologic media. Lagedrost, J.F.; Capps, W. **(Fiber Materials, Inc., Biddeford, ME (USA)).** Dec. 1983. 179p. NTIS File Number DE84004926. GPO Dep.

is indexed as:

Fiber Materials, Inc., Biddeford, ME (USA)

• Personal Author Index

Each author's name is indexed in the form appearing on the document abstracted, with the exception that given names are reduced to initials:

Capps, W., *See* Lagedrost, J. F.
Lagedrost, J.F., Thermal property and density measurements of samples taken from drilling cores from potential geologic media, 9:5785 (R;US)
McKenna, K.F., Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC), 9:15701 (J;US)
Rej, D.J., *See* McKenna, K.F.
Tuszewski, M., *See* McKenna, K.F.

• Subject Index

The subject index consisting of entries naming specific materials, objects, and processes is arranged alphabetically. Document titles, informative phrases, or both specific to these entries are arranged alphabetically under the entries.

SALT DEPOSITS
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Thermal property and density measurements of samples taken from drilling cores from potential geologic media, 9:5785 (R;US)
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• Contract Number Index

DOE technical report literature is indexed using contract numbers. This index contains the contract number with corresponding abstract and report numbers.

AC06-76RL01830	**Fiber Materials, Inc., Biddeford, ME (USA)**	
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• Report Number Index

Technical report literature is also indexed using report numbers. This index includes information on where individual reports may be obtained. Patents and conference papers are indexed here as a matter of convenience. When a report is supplied under a File Number, that number is included in the availability statement. A file number–report number correlation is included for convenience.

BMI/ONWI-522	**9:5785**	**NTIS, PC A09/MF A01. File Number DE84004926, Distribution Category MN-70**

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Foreign Sources

CEA Centre d'Etudes de Saclay
GIF-sur Yvette Cedex, France

Fachinformationszentrum
Energie, Physik, Mathematik GmbH
Karlsruhe, Federal Republic of Germany

IEA Biomass Conversion Service
Dublin, Ireland

IEA Coal Research
Technical Information Service
London, England

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Oak Ridge, TN

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Springfield, VA

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Bethesda, MD

NOVA Information Services Company
Commack, NY

Plenum Publishing Corporation
New York, NY

University of Tennessee
Graduate School of Library and Information Sciences
Knoxville, TN

Communication concerning the editorial policy and content of *Energy Research Abstracts* should be addressed to the Editor, *Energy Research Abstracts,* Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, TN 37831.

SUBJECT CONTENTS (NUMERICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 39 first-level and 286 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope definitions and limitations is available as DOE/TIC-4584-R6 from NTIS for $9.50.

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01 COAL AND COAL PRODUCTS

47142 **(ORNL/FMP—86/2) AR and TD Fossil Energy Materials Program. Quarterly progress report for the period ending March 31, 1986.** (Oak Ridge National Lab., TN (USA)). Jun 1986. Contract AC05-84OR21400. 447p. NTIS, PC A19/MF A01; 1; GPO Dep. File Number DE86014333.

The objective of the AR & TD Fossil Energy Materials Program is to conduct research and development on materials for fossil energy applications with a focus on the longer-term and generic needs of the various fossil fuel technologies. The program includes research aimed toward a better understanding of materials behavior in fossil energy environments and the development of new materials capable of substantial enhancement of plant operations and reliability. The management of the Program has been decentralized to the DOE Oak Ridge Operations Office (ORO) and the Oak Ridge National Laboratory (ORNL) as technical support contractor. The ORNL Fossil Energy Materials Program Office compiles and issues this combined quarterly progress report from camera-ready copies submitted by each of the participating subcontractor organizations. It is the intent of the AR & TD Fossil Energy Materials Program to sponsor materials research which is generic to a number of fossil energy technologies. It is hoped that this series of AR & TD Fossil Energy Materials Program quarterly progress reports will aid in the dissemination of information developed on the program.

0104 Processing

REFER ALSO TO CITATION(S) 47185, 47193, 47198, 47199, 48136, 48173, 48194

47143 **(BMFT-FB-T—86-013) Simulation of underground coal gasification. Phase I. Final report.** Guntermann, K.; Beyer, L.; Choi Jaeou; Fuhrmann, F.; Klingenberger, P.; Rangitsch, M.; Richter, K. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Technische Hochschule Aachen (Germany, F.R.). Lehrstuhl und Inst. fuer Eisenhuettenkunde). Jan 1986. 162p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE86752560.

The report summarizes experimental findings on in-situ gasification of domestic coal. For example, self-ignition of pressurized and pressureless coal was investigated using a specially developed method of differential thermoanalysis providing both kinetic and caloric data of the coal. Experiments on reverse combustion of anthracite showed no marked degree of channelling. Examples are presented on linking by directional drilling, and a facility simulating overburden pressure was developed and constructed. Block combustion experiments were carried out on six compact coal cores, two under steady pressure of 10 or 20 bar, and four under alternating pressure. Gasification with alternating pressure resulted in coke with a distinctly banded structure. Two simplified models were established for precalculating the influencing parameters of alternating-pressure gasification. To achieve comparability of past and future simulation experiments, investigations into the kinetics of pyrolysis and gasification were carried out. With 32 refs., 5 tabs., 98 figs.

47144 **(BMFT-FB-T—86-019) Production of synthesis gas, town gas and substitute natural gas by the gasification of coarse graded hard coal under pressure using oxygen - Lurgi pressure gasification process. Report on operation phase II. Final report.** Ahlers, M.; Peyrer, H.P.; Schaefer, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Ruhrgas A.G., Essen (Germany, F.R.)). Feb 1986. 140p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752561.

Operating phase II continued the work of phase I. Significant earlier results associated with the increase in the gasifier pressure from 25 to 95 bar were confirmed. The increase in pressure raised the methane content of the raw gas from 9 to 17%, improved the gasifier efficiency from 80 to 85%, doubled coal throughput and reduced specific oxygen consumption by some 10 to 30%. The generator could be used to gasify coal with a fines content (6 mm and less) of up to 60% and an ash content between 20 and more than 50% at high coal throughput and carbon conversion rates. Different types of agglomerates could also be processed effectively. The environmental compatibility of the process was demonstrated by a series of measurements designed for this purpose. Phase I see BMFT-FB-T--83-151. With 14 tabs., 29 figs.

47145 **(BNL—38255) Effect of non-reacting gases on the flash methanolysis of coal.** Mikesell, P.C.; Chandavarkar, A.S.; Rahaman, R.S. (Brookhaven National Lab., Upton, NY (USA); Massachusetts Inst. of Tech., Brookhaven, NY (USA). School of Chemical Engineering Practice-Brookhaven Station). Aug 1985. Contract AC02-76CH00016. 56p. (MIT/BNL—85-3). NTIS, PC A04/MF A01; GPO Dep. File Number DE86014126.

The effects of system pressure, coal particle size, helium and nitrogen concentration in the feed gas, and methane to coal feed ratio on the yields of ethylene and benzen-toluene-xylene (BTX) in the flash methanolysis of coal were investigated. Experiments were conducted in an 8-foot long, 1-inch diameter entrained downflow tubular reactor. Higher ethylene yields were observed at a lower pressure, a smaller coal particle size, and higher methane to coal ratios. Any effect of the addition of nitrogen or helium to the feed gas on ethylene yield was masked by the standard error involved in the experimental procedure. None of the variables studied has a significant effect on BTX yields. The flash methanolysis process is transport limited and not equilibrium controlled. The overall process is exothermic; the heat of reaction correlates with the ratio of methane converted to coal converted. A preliminary economic analysis indicates that the process is not currently viable. 26 refs., 10 figs., 24 tabs.

47146 **(CONF-860608—7) Mechanical properties and corrosion behavior of structural ceramics exposed to coal gasification environments.** Hobday, J.M.; Easler, T.E. (Argonne National Lab., IL (USA); USDOE Morgantown Energy Technology Center, WV). Apr 1986. Contract W-31-109-ENG-38. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014558.

From World congress on high tech ceramics: electronic, engineering, nuclear, biomedical research and applications in focus; Milan, Italy (23 Jun 1986).

Applications of structural ceramics in coal conversion systems are discussed in an overview of the US Department of Energy's (DOE) research program on structural ceramics. Specifically emphasized is DOE-sponsored work at Argonne National Laboratory (ANL) evaluating the corrosion behavior and changes in mechanical properties of structural ceramics (sintered alpha silicon carbide, siliconized silicon carbide) after exposure to simulated coal gasification environments at 1000 to 1300°C for periods up to

500 h, with and without coal slag coatings. Results on the effects of exposing ceramics with and without slag coatings to higher oxygen partial pressures (i.e., combustion environments) will be compared to those for low oxygen partial pressures (coal gasification environments) to emphasize the influence of environment on corrosion behavior and mechanical properties. 8 refs., 5 figs., 4 tabs.

47147 **(DOE/ET/10532—T32) Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes. Thirteenth interim report, processing of 750 degrees end point Illinois ITSL oil: engineering design studies and estimated processing costs.** Frumkin, H.A. (Chevron Research Co., Richmond, CA (USA)). Aug 1986. Contract AC22-76ET10532. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014976.

This report presents refining plans and cost estimates for converting 7°F end point Illinois Integrated Two-Stage Liquefaction (ITSL) process oil to transportation fuels. Refining cost is estimated to be $15.5 to $17.5/bbl of desired product for 50,000 bbl/day, in the same range as costs previously estimated for feeds from other coal liquefaction processes. Yield of desired products from this feed is about 10% higher than from previously studied feeds. 2 refs., 15 tabs.

47148 **(DOE/FE—0067) Report on the first international forum for enhanced collaboration in the clean use of coal: coal liquefaction.** (USDOE Assistant Secretary for Fossil Energy, Washington, DC). 1986. 87p. NTIS, PC A05/MF A01; GPO Dep. File Number DE86015107.

The International Forum on Coal Liquefaction (IFCL) can be viewed as a first step in, and the first practical experience with, implementation of a process aimed at ensuring that opportunities for fruitful international collaboration are not missed. It provided an occasion for a free exchange and joint forward look at R & D options in coal liquefaction. The IFCL evolved from the knowledge that many countries are endeavoring to improve economic growth and simultaneously reduce requirements for governmental expenditures. Many countries are also supporting development of innovative energy technologies for production of energy at reasonable costs and with acceptable environmental consequences, but, in keeping with the preceding objective. The conversion of coal into liquid fuels is a particularly appropriate area in which to initially test the collaboration concept as this developing technology requires substantial effort, risks and financial support although with consequent national benefits. Three topical areas seem particularly appropriate for enhanced collaboration based on the results of the forum. These areas are indirect liquefaction, coprocessing, and basic research. In other areas, including pyrolysis and advanced and innovative concepts, the participants expressed a desire to pursue the initiative further. Joint program planning can help alleviate some of the problems related to the more traditional cooperation activities by providing improved efficiency of R & D investments. Necessary prerequisites to success include finding partners with common or complementary interests; who are at similar levels of technical expertise or, at least, interest; who are at the appropriate stage of research and development; and who are also willing to become interdependent to gain the maximum use of collective resources and to keep the program moving forward at a measured pace.

47149 **(DOE/FE/60181—2084) Kinetics of catalyzed steam gasification of low-rank coals to produce hydrogen. Final report for the period ending March 31, 1986.** Galegher, S.J.; Timpe, R.C.; Willson, W.G.; Farnum, S.A. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 41p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014268.

The principal goal of coal char-steam gasification research at the University of North Dakota Energy Research Center (UNDERC) is to establish the feasibility of low-rank coal gasification for hydrogen production. The program has focused on determining reaction conditions for maximum product gas hydrogen content and on evaluating process kinetics with and without catalyst addition. The high inherent reactivity of lignites and subbituminous coals, compared to coals of higher rank, make them the probable choice for use in steam gasification. An extensive matrix of char-steam gasification tests was performed in a laboratory-scale thermogravimetric analyzer (TGA) at temperatures of 700°, 750°, and 800°C. Four low-rank coals and one bituminous coal were included in the TGA test matrix. Catalysts screened in the study included K_2CO_3, Na_2CO_3, trona, nahcolite, sunflower hull ash, and lignite ash. Results showed uncatalyzed North Dakota and Texas lignites to be slightly more reactive than a Wyoming subbituminous coal, and 8 to 10 times more reactive than an Illinois bituminous coal. Several catalysts that substantially improved low-rank coal steam gasification rates included pure and mineral (trona and nahcolite) alkali carbonates. The reactivity observed when using trona and nahcolite to catalyze the steam gasification was the highest, at nearly 3.5 times that without catalysts. The use of these inexpensive, naturally-occurring alkalis as gasification catalysts may result in elimination of the need for catalyst recovery in the hydrogen-from-coal process, thereby simplifying operation and improving process economics. The study included evaluations of temperature and catalyst loading effects, coal and catalyst screening, and determinations of the apparent activation energies of the steam gasification reaction. 11 refs., 23 figs., 9 tabs.

47150 **(DOE/FE/60181—2085) Low-rank coal liquefaction mechanisms. Final report for the period ending March 31, 1986.** Willson, W.G.; Farnum, S.A. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 21p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014269.

The study of high-severity liquefaction carried out at UNDERC using Big Brown Texas lignite demonstrated the viability of natural abundance ^2H NMR spectroscopy for the study of coal conversion reactions, particularly H-transfer chemistry. Several observations were made that indicated that further investigations in this area would be fruitful. They are: (1) differences in natural abundance ^2H NMR distributions resulted from differences in the processing history of the samples; and (2) the addition of small amounts of H-donor to a liquefaction reaction changed the natural abundance ^2H NMR distribution with respect to an identical run without added donor. The ^1H and ^{13}C distribution were unchanged. These observations mean that the history of a sample could be compared with that of another sample and that the H-donor history may be deduced from the comparative data. Some mechanistic and kinetic information was obtained from high-severity liquefaction reactions with labeled syngas ($^2H_2/CO$ and $H_2/^{13}CO$). Tests made with $^2H_2/CO$ showed product incorporation of ^2H to be greater than 270 times the natural abundance level as determined by standard addition ^2H NMR spectroscopy and the ^2H distribution was not the same as in the unlabeled test. ^2H entered all fractions of the product during the test including the distillate alkanes, phenols and polars, H_2O, and soluble vacuum bottoms. Polars and H_2O were the most enriched fractions, due to relatively easy H-exchange. There was a distinct isotope effect on the yield as processing with $^2H_2/CO$ resulted in decreased conversion to THF solubles when compared with the identical test with $^1H_2/CO$. 22 refs., 2 figs., 7 tabs.

47151 **(DOE/FE/60181—2086) Low-rank coal liquefaction solvent effects. Final report for the period ending March 31, 1986.** Willson, W.G.; Farnum, S.A. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 61p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014280.

Several areas of research pertaining to solvent effects on low-rank coal liquefaction were investigated. A set of three direct liquefaction experiments were carried out in the UNDERC continuous process unit under the conditions shown by previous experiments to give the highest distillate yield. Each experiment was carried through at least 40 four-hour yield periods before it was terminated, to provide samples of process-derived "lined-out" recycle solvent and equilibrium samples of coal-derived products. Two coals, a North Dakota lignite and a Wyoming subbituminous coal, were compared in the same solvent, and the North Dakota lignite was processed in two very different solvents. The processing conditions were kept at the same nominal values throughout the three runs. The two start-up solvents were chosen because they differ in several important ways. The PDU solvent contained about seven times as much total alkane content and ten times as much n-alkane content than did the A04 solvent. The PDU solvent also contained

a higher concentration of methylated and other alkylated aromatic hydrocarbons than A04. These differences in composition are expected to affect the solvating power of the solvent toward the coal and coal-derived products. The difference in reactive nature of the solvents at high temperature and pressure is expected to lead to different initial products. One of the objectives of this set of experiments was to determine whether these differences would affect the composition of the products at line-out. Another goal of the experiments was to assess the differences in the operability, yield, and nature of the products when two different low-rank coals were liquefied with the same start-up solvent. 25 refs., 22 figs., 6 tabs.

47152 **(DOE/FE/60181—2087) ChemCoal Process CPU recycle development program with Indian Head lignite. Final report for the period ending March 31, 1986.** Willson, W.G.; Knudson, C.L.; Farnum, S.A.; Cisney, S.; Ness, R.; Rindt, J.R.; Porter, C.R.; Brolick, H.J. (North Dakota Univ., Grand Forks (USA). Energy Research Center; Carbon Resources, Inc., Wheat Ridge, CO (USA)). Jun 1986. Contract FC21-83FE60181. 113p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014270.

The ChemCoal Process uses a chemical method to separate ash and sulfur compounds from the organic matrix of coal. The chemical method is an ionic reaction between the phenolic solvent, alkali, coal, and a reductant such as carbon monoxide. The combination of phenolics and alkali act as a good physical solvation medium for the organics in the coal. When heated to between 325° to 340°C at pressures below 12.4 MPa (1800 psig), the organic matrix of the coal is broken down by the reactions of the phenolics and alkali and carbon monoxide to produce lower molecular weight material which is dissolved in the organic solvent. The ash and mineral matter from the coal remain as suspended solids in the aqueous phase. These solid inorganic impurities are removed by centrifugation and filtration, leaving an organic liquid low in ash and sulfur. Distillation is used to recover recycle solvent, a light chemical fraction, and to produce the solid ChemCoal fuel product. This recycle test was primarily aimed at resolving potential process flaws identified in a 1985 report by Bechtel Group, Inc., "ChemCoal Process Evaluation Study." The recycle results showed: excess solvent (113%) was generated under all conditions; no loss in conversion as process derived solvent replaced startup solvent in multiple recycles; reductant consumption was below 2.0 wt % of the maf coal as hydrogen gas; conversion remained relatively constant; ChemCoal process conversion averaged over 80% of maf coal; alkali recovery using the partitioning solvent was greater than 62 wt %; and processing energy requirements were reduced. Based on the successful completion of this program and the elimination of identified potential flaws, UNDERC supports a recommendation for the further development of the ChemCoal Process. 5 refs., 70 figs., 19 tabs.

47153 **(DOE/FE/60181—2095) Supercritical solvent extraction. Final report for the period ending March 31, 1986.** Swanson, M.L.; Olson, E.S.; Diehl, J.W. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 61p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014278.

Supercritical solvent extraction (SCSE) has been performed at the University of North Dakota Energy Research Center (UNDERC) using a semicontinuous extraction system. Extractions were performed using low-rank coals and supercritical solvents which included water, methanol, and various hydrocarbons such as benzene, cyclohexane, trimethylpentane and the n-alkanes; n-hexane through n-octane. Except for the supercritical water runs, these experiments were carried out at temperatures below the temperature where significant thermal decomposition of the coal occurs (i.e., ≤350°C). The objective of this work has been to establish the fundamental principles of coal-solvent interactions at or above the solvent critical point. Results from supercritical water extractions indicate that conversions ranged from 40% to 50% while extract yields ranged from 10% to 30% at 380°C. Extract yields between 0.7% and 6.2% were obtained with lower temperature extractions (≤350°C) of a North Dakota lignite using various simple hydrocarbon solvents at supercritical conditions. These yields were found to increase with increasing solvent temperature and solvent pressure or density. In contrast to the extractions with supercritical hydrocarbon solvents in which the extract was composed mainly of alkanes and long-chain fatty acids and the yield of extract varied little with temperature and pressure, the extraction with supercritical methanol showed a dramatic increase in extract yield with increasing temperature and preasure. The composition of the extract varied with the increase in temperature, with phenolics and methyl ethers predominating at the higher temperatures (up to 350°C). 40 refs., 28 figs., 20 tabs.

47154 **(DOE/MC/19207—2133) Plasticity, agglomeration and volatiles secondary reactions in coal pyrolysis. Final technical progress report.** Howard, J.B.; Fong, W.S.; Serio, M.A.; Beitz, B.R.; Hsu, J.; Lennox, R.B.; Montero-Garcia, J.H.; Sawada, K.; Sontheimer, S.G.; Suzuki, Takeo. (Massachusetts Inst. of Tech., Cambridge (USA)). Jul 1986. Contract AC21-82MC19207. 112p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86013321.

Initial softening of the coal is by physical melting of an estimated 25% by weight of the coal. Up to 40% by weight of the coal is further converted to liquids by pyrolytic bond breaking. These liquids can condense or polymerize to give higher molecular weight liquids and solids, and crack to give gas and coke, or escape from the coal particle to give tar. The result is that the liquid weight averaged molecular weight can increase from 570 to above 800, and then decrease to around 600. Experimental viscosity and intraparticle liquid formation/depletion data are described by a global model that accounts for melting, generation and depletion of the liquid, and volatiles formation. The kinetic parameters find quantitative application in modeling coal particle agglomeration and swelling behavior under rapid heating conditions. Predictions of models here developed are in qualitative accord with literature data on swelling. The homogeneous secondary reactions of tar appear to be well-described by a model which includes three "lumps" of high, medium, and low reactivity. These lumps imply the existence in tar of three broad classes of bond strengths. Analysis of the data on tar and other products allowed identification of many of the bonds in each group. In general, the homogeneous secondary reactions involve cracking at the periphery of aromatic rings, which remain largely intact, leading to lower molecular weight tars and light products (gases, light oils). The conversion of aromatic rings results in a direct relationship between the fractions of aromatic carbon or aromatic hydrogen and the tar conversion, allowing the determination of kinetic parameters from analytical measurements on surviving tar. 40 refs., 54 figs., 4 tabs.

47155 **(DOE/MC/20183—2074) Low-energy process for separating coal gasification products. Final report.** Yang, R.T.; Cen, P.L.; Ritter, J.A. (State Univ. of New York, Buffalo (USA). Dept. of Chemical Engineering). Aug 1985. Contract AC21-83MC20183. 177p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE86006633.

The program was aimed at demonstrating the feasibility and establishing the optimum conditions for separating coal gasification products by pressure swing adsorption (PSA) using activated carbon as the sorbent. A data base was developed for the equilibrium adsorption of H_2, CO, CH_4, CO_2, H_2S and their mixtures on carbon in the temperature range of 20 to 110°C and pressure range of 0 to 900 psig. The mixture data were fitted with four theories: ideal adsorbed solution, real adsorbed solution, loading ratio correlation, and linear partial pressure. Deviations between theory and experiment varied from 2 to 50%, which are in the same range as literature data for other gas-solid systems. Several PSA cycles were developed for separating coal gasification products. A typical 5-component mixture at 100 to 300 psig could be separated into three useful products: clean H_2 (<0.01% H_2S) at >99% purity, clean fuel gas, and an acid gas containing over 5% H_2S and 60% CO_2. Three models were developed for bulk PSA separations; equilibrium, linear driving force, and pore diffusion. The models were capable of predicting all observed PSA characteristics. Large temperature excursions were observed in bulk PSA processes. Improved PSA cycles to overcome the temperature excursions and hence to give better separations were suggested. 28 refs., 58 figs., 22 tabs.

47156 **(DOE/MC/21048—2067) Safety in entrained coal gasifiers with dry feed.** Frumerman, R.; Baetens, C. (Frumerman Associates, Inc., Pittsburgh, PA (USA)). Apr 1986. Contract AC21-84MC21048. 182p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE86006623.

Entrained coal gasifiers with dry feed require special safety measures unique to that type of gasifier. Because they operate with practically no fuel inventory, feed failure results in flameout in seconds. If that condition goes undetected and the flow of fuel restarts and after a delay of some seconds is reignited, the fuel accumulated in the gasifier during the flameout period can explode or even detonate vigorously enough to rupture the gasifier. To avoid this possibility, loss of fuel must be detected and suitable measures, such as stopping the flow of oxidant and preventing restart of coal flow, taken within seconds. Reliable methods of real time dry solid flow measurement are not commercially available, so development to address this possible hazard was undertaken. The history of this development for the five ton per hour BI-GAS pilot plant and the nominal thirty ton per day Mountain Fuel Resources Process Development Unit is related. 22 refs., 19 figs., 10 tabs.

47157 **(DOE/MC/21377—2155) ASPEN sensitivity study for the Great Plains Gasification Plant gasifier model, documentation and experimental verification.** Benjamin, B.W. (Scientific Design Co., Inc., New York (USA)). 23 Jul 1986. Contract AC21-84MC21377. 258p. NTIS, PC A12/MF A01; 1; GPO Dep. File Number DE86014073.

A previously developed ASPEN model of a coal gasifier, RGAS, has been used to simulate the operation of the Morgantown Energy Technology Center (METC) 42 inch gasifier under actual test conditions. The preliminary METC test data provided to Halcon for this study was for two coals, Arkwright coal and Indian Head lignite. Either air or oxygen was used as the oxygen source. RGAS was designed to calculate the variables which characterize gasifier performance. The kinetic expressions employed for this study were the Ash Segregation equations of the University of Delaware model. A full discussion and description of the differential equations used in the gasifier model (including the devolatilization model) was provided in a previous topical report (Rinard 1985). The structure of the ASPEN model and previous simulation results were described in another topical report (Benjamin 1985). For completeness, the model structure information contained in these topical reports has been carried over to this study. Thus, this report can be used as a stand-alone guide to RGAS. The model and software generated in the previous study were not changed in this effort. This investigation was directed towards applying the RGAS model to the simulation of actual plant operation by tuning the appropriate kinetic parameters. The period of METC operation which appeared to be the most stable and which had the best material balance closure for each type of coal was selected as the most suitable candidate for tuning. The kinetic constants of the selected kinetic model were adjusted to yield an outlet gas composition close to that reported by METC. The method of tuning is explained in the report.

47158 **(DOE/MC/21377—2156) ASPEN sensitivity study for the Great Plains Gasification Plant Methanation Section.** Benjamin, B.W.; Cascone, R.F. (Scientific Design Co., Inc., New York (USA)). 25 Jul 1986. Contract AC21-84MC21377. 182p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE86013961.

A previously developed ASPEN (Advanced System for Process Engineering) model of the Methanation Section (Section 1700) of the Great Plains Gasification Plant was enhanced. In this study, the original model was modified to conform with a set of preliminary computer process control diagrams from the plant. In addition, a detailed simulation of the utility requirements of the Methanation Section was included. Two types of flowsheet studies were conducted. Design cases were those simulations in which the equipment size was calculated based on such stated system requirements as a fixed temperature approach for a given heat exchanger. Rating cases were those simulations in which the size of the reactors and heat exchangers were fixed. The design case developed in this study was shown to be fairly robust in perturbation studies. However, the rating model developed from the design base case was not as flexible when subject to perturbations in hydrogen feedrate. This was to be expected since the amount of hydrogen entering the reactors has a great effect on the heat generated in the reactors. This heat must be removed in the heat exchangers, which, in the rating case, were of fixed size. The simulations clearly show that an increase in hydrogen in the feed to the methanation section can not be compensated for by the heat exchange network currently in use.

47159 **(DOE/MC/21377—2158) ASPEN sensitivity study for the Great Plains Gasification Plant rectisol section.** Farrell, R.J.; Rinard, I.H. (Scientific Design Co., Inc., New York (USA)). 25 Jul 1986. Contract AC21-84MC21377. 677p. NTIS, PC A99/MF A01; 1; GPO Dep. File Number DE86014075.

A previously developed ASPEN model of the Rectisol portion of the Great Plains Plant has been extensively revised to more closely represent the as-built plant as reflected by the plant control (PMX) diagrams. The revised models have been used to obtain a closed material balance of the Rectisol Plant. This corrects the main deficiency of the initial model which had never been run to a closed material balance. For simulation purposes, the plant is divided into three sections and a rigorous ASPEN model has been developed for each of the sections: (1) H_2S Absorption and Flash Regeneration, (2) Hot Regeneration and Naphtha Extraction, and (3) Methanol Recovery and Naphtha Stripping. A single Linear ASPEN Model for the entire Rectisol Plant has also been developed for the purpose of converging the models to a closed overall material balance. Extending ASPEN by incorporating a Simultaneous Modular convergence algorithm was investigated. This worked successfully for several simple problems including that of Cavett, although there were no computer running time advantages over the conventional Sequential Modular approach. When applied to more complex problems such as the Rectisol Plant, it failed for a variety of reasons and the rigorous section models combined with a separate linear model approach was used instead. 13 refs., 11 figs.

47160 **(DOE/METC—86/0228) Gas stream cleanup. Technology status report.** (USDOE Morgantown Energy Technology Center, WV). Apr 1985. 78p. NTIS, PC A05/MF A01; GPO Dep. File Number DE86001032.

The required levels of contaminant removal for the applications discussed herein are readily achievable with cold gas cleanup systems. However, the potential for hot gas cleanup to increase the overall efficiency of power systems is significant, and overall cost per unit capacity for such systems is expected to diminish substantially relative to cold gas cleanup. Indeed, implementation of a pressurized fluidized-bed combustor (PFBC) is not achievable without hot gas cleanup. Hot gas cleanup systems for removing fuel gas contaminants offer the highest overall system efficiency if they operate between the gasifier exit temperature and the inlet temperature of the MCFC or the gas turbine. These hot has cleanup processes retain the sensible heat from the gasifier to avoid gas reheat prior to entry into the MCFC or gas turbine. Hot gas cleanup processes will eliminate the need for low-temperature heat exchangers, water quench systems, and wastewater treatment processes. The development of hot gas cleanup is expected to reduce the cost of electricity made from coal. The extent of the cost reduction depends on the development of hot gas cleanup technologies that easily and reliably clean up product gas or combustion products to the tolerances required for various applications. 37 refs., 16 figs., 8 tabs.

47161 **(DOE/METC—86/6038) Hot gas cleanup for electric power generating systems.** (USDOE Morgantown Energy Technology Center, WV). May 1986. 47p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86006607.

The US Department of Energy (DOE), Morgantown Energy Technology Center (METC) is sponsoring research on advanced methods for removing contaminants from the hot, fuel gas streams of coal-fired combustion or gasification plants. Contaminants present in all coals such as ash particles, compounds of sulfur and nitrogen, and alkali metals must be controlled because they are environmental problems, are detrimental to advanced generation power equipment, or both. Significant advances have been made in the high-temperature control of these contaminants. One of the most promising advanced power-generating systems uses hot gas

cleanup in an integrated, gasification combined-cycle (IGCC) concept to control coal contaminants. This report discusses the status and significant accomplishments of hot gas cleanup research in support of this advanced power generation system. The objective of the DOE hot gas cleanup program is to develop the technology to economically remove hot gas-stream contaminants. The projects that comprise the program are mainly aimed at gas streams generated at pressures greater than 6 atmospheres and temperatures greater than 1000°F. These elevated pressures and temperatures are typical of emerging technologies such as IGCC and gasifier/molten-carbonate fuel-cell (MCFC) power plants, direct-fired coal turbines, and pressurized fluidized-bed combustors. Control and removal of the contaminants is either a technical limitation or a major cost associated with these advanced systems. 113 refs., 18 figs., 4 tabs.

47162 **(DOE/PC/50798—T14) Catalyzed gasification of coal: isotope and XPS studies, May 16-August 15, 1986.** Falconer, J.L. (Colorado Univ., Boulder (USA)). 15 Aug 1986. Contract FG22-82PC50798. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014358.

This research aims to elucidate the reaction mechanism for the catalytic gasification of coal by metal carbonates, by identifying the reaction pathways and the active form of the catalyst. The insight into the mechanism will help in improving process kinetics of coal gasification. Alkali carbonates and alkaline earth carbonates are being used to catalyze the carbon dioxide-carbon gasification reaction. Temperature-programmed reaction, isotopic labeling of the carbon and oxygen atoms in the carbonate, and mass spectrometric detection of labeled products are used to identify reaction pathways. X-ray photoelectron spectroscopy (XPS) analysis of carbon-carbonate mixtures is used, at reaction conditions, to determine the chemical state of the carbonate.

47163 **(DOE/PC/70786—T6) Transition metal catalysis of hydrogen shuttling in coal liquefaction.** Eisch, J.J. (State Univ. of New York, Binghamton (USA)). 1 Apr 1986. Contract FG22-84PC70786. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013314.

The ultimate objective of this research is to uncover new catalytic processes for the liquefaction of coal and for upgrading coal-derived fuels by removing undesirable organosulfur, organonitrogen and organooxygen constituents. Basic to both the liquefaction of coal and the purification of coal liquids is the transfer of hydrogen from such sources as dihydrogen, metal hydrides or partially reduced aromatic hydrocarbons to the extensivearomatic rings in coal itself or to aromatic sulfides, amines and ethers. Accordingly, this study is exploring how much crucial hydrogen-transfer processes might be catalyzed by soluble, low-valent transition metal complexes under moderate conditions of temperature and pressure. During the sixth quarter the following studies were undertaken: comparative hydrogen shuttling studies were conducted with 1,4-dihydrobenzene, 1,4-dihydronaphthalene and 9,10-dihydropehnanthrene; carbon-carbon bond cleavage reactions were undertaking with 1,2-diarylethanes and strained hydrocarbons, such as 1,2,3-triphenylcyclopropene; and attempts continue to obtain suitabe crystals of certain intermendiates in nickel-promoted cleavage reactions. The following progress has been made: comparative hydrogen-shuttling studies of these aromatics show that $Ni(Cod)_2$ can catalyze hydrogen transfer approximately in this decreasing order: 1,4-dihydrobenzene > 1,4-dihydronaphthalene > 9,10-dihydrophenanthrene; 1,2,3-triphenylcyclopropene is readily cleaved by Ni(Byp)(Cod) to yield triphenylpropene isomers upon hydrolysis; and samples of $LiAlH_2$(Byp)Ni are being prepared for x-ray crystal structure determination.

47164 **(DOE/PC/70791—T5) Studies in chemical and electrochemical coal conversion. Technical progress report, February 1-April 30, 1986.** Kubiak, C.P. (Purdue Univ., Lafayette, IN (USA). Dept. of Chemistry). 1986. Contract FG22-84PC70791. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014160.

The deoxygenation of phenols to arenes is a conceptually simple, yet synthetically difficult organic transformation. The deoxygenation of phenolic residue is also of extreme importance in coal liquefaction and in obtaining high quality organic feedstocks from coal derived liquids. Although a very small number of successful methods have been reported for phenol deoxygenation, these often require stringent reaction conditions which limit reaction scope and product selectivity. A highly attractive goal is to devise a transition metal mediated catalytic system which can effect the deoxygenation under mild conditions. Such a system could be of considerable practical importance for coal liquefaction. We describe a number of recent observations which directly address the problem of devising such a system. The deoxygenation of 2,6-dimethylphenol to m-xylene raises an exciting possibility of devising a catalytic system using the above $Pd_3(OAr)_2(dmpm)_3$ complexes. We are presently examining the effect of phenol concentration, temperature and pH in order to optimize the yields for arene production. In addition, efforts are in progress to establish the interrelationships of the different observed organometal species to understand the details of the reaction steps. The use of liquified coals as substrates for deoxygenation is planned. 5 refs.

47165 **(DOE/PC/70801—T7) Thermodynamic properties for supercritical coal conversion. Quarterly progress report, April 1-June 30, 1986.** Eckert, C.A. (Illinois Univ., Urbana (USA). Dept. of Chemical Engineering). 1986. Contract FG22-84PC70801. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013652.

The objective of this research is to investigate the behavior of supercritical fluid (SCF) systems for the purpose of processing coal. The medium temperature solubility apparatus completed last quarter is currently being run with supercritical ammonia solvent (Tc = 132°C). Solubilities of anthracene were measured at 142°C and 162°C over a pressure range of 1850 to 5000 psia. Runs with dodecahydrotriphenylene have been completed at 142°C. Runs at 162°C are currently in progress. We attempted to determine the solubility of thioxanthone in ammonia but the solute appears to be reacting and is under investigation. Phenazine and thianthrene were too soluble to obtain reasonable results with the apparatus. The solubility of dibenzothiophene and dibenzofuran in carbon dioxide have been measured at 35, 50, and 70°C in the low temperature apparatus. Studies with carbazole were discontinued due to virtual insolubility at these low temperatures. However, we have measured the solubility of thianthrene in carbon dioxide at 35 and 50°C. Runs at 70°C are currently in progress. High temperature supercritical solvents like ammonia show significant potential in extracting coal type compounds. Studies with anthracene and dodecahydrotriphenylene indicate higher solubilities than in lower temperature solvents like carbon dioxide. 3 figs.

47166 **(DOE/PC/71257—T7) Novel experimental studies for coal liquefaction. Quarterly progress report, April 1-June 30, 1986.** Holder, G.D.; Shah, Y.T.; Tierney, J.W. (Pittsburgh Univ., PA (USA)). 1986. Contract FG22-84PC71257. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013559.

Progress reports are presented for the following two tasks: (1) thermal behavior of slurry reactors used for indirect coal liquefaction; and (2) coal liquefaction under supercritical conditions. For task 1, work is being done using three indirect liquefaction routes involving synthesis gas - the Fischer-Tropsch reaction, the one-step conversion to methanol, and the two-step conversion to methanol. Experimental work during the last quarter was concentrated on examining the first step of the two-step process - the carbonylation of alcohols using potassium alcoholates as the catalyst. The alcohol used was methanol; the catalyst used was potassium methoxide. The reaction was very selective to methyl formate. The only observable by-products were a small amount of white precipitate and formaldehyde. The objective of task 2 is to measure transfer rates for naphthalene extraction by carbon dioxide in order to determine how mass transfer coefficients vary with pressure, flow rate and bed height. During this past quarter, the new apparatus worked effectively and mass transfer coefficients were obtained at 20 atm and 25C. 8 figs., 3 tabs.

47167 **(DOE/PC/80023—T5) Development of an in-situ hydrogen measuring instrument for coal liquefaction processes. Quarterly report, April-June 1986.** Klinzing, G.E. (Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering). 1986. Contract AC22-85PC80023. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014251.

During this three-month-period, the work on the container boxes was finished, together with the computer-control-box and the new probe for Wilsonville. Pressure test on all these equipment was done and no leaks were found. Also the system was tested on our laboratory and was found to be working properly. Some changes were done in the equipment installed at the university in order to obtain more reliable data. Data of solubility of hydrogen in tetralin were taken, and the system hydrogen-ethane-tetralin was studied. The data of solubility are in good agreement with the literature.

47168 **(DOE/PC/80509—T3) Enhanced coal liquefaction by pyrolysis in supercritical fluids. Quarterly progress report, April-June 1986.** Paulaitis, M.E.; Klein, M.T.; Sandler, S.I. (Delaware Univ., Newark (USA). Dept. of Chemical Engineering). 1986. Contract FG22-85PC80509. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013959.

This research program involves a fundamental investigation of a novel coal liquefaction process that combines pyrolysis and supercritical-fluid solvent extraction. The experimental work consists of determining: (1) coal pyrolysis reaction pathways, kinetics and mechanisms; (2) equilibrium solubilities of coal-related compounds (e.g., primary liquefaction products) in supercritical water and solvent mixtures containing selected primary liquefaction products with supercritical water. Experiments involving model coal compounds will be accomplished to determine the fundamental factors associated with the mild pyrolysis of coal in supercritical fluids with the aim of developing optimal conversion strategies for actual coals. The thermolysis of phenethyl phenyl ether (PPE) and diphenyl propane (DPP) was studied in both neat solution and in water. The reaction network for PE in water exhibits an additional pathway in water. This pathway is the solvolysis of PPE to produce phenethyl alcohol and phenol. The product spectrum obtained for neat phyolysis of DPP was identical to that obtained for thermolysis in water. Thus the additional solvolysis pathway is not observed for this model coal compound reacting in water. 3 figs.

47169 **(DOE/PC/81201—T3) Microbial removal of organic sulfur from coal. Third quarterly report, April-June 1986.** Fannin, K.F.; McKinley, V.L.; Conrad, J.R.; Maka, A. (Institute of Gas Technology, Chicago, IL (USA)). Jun 1986. Contract AC22-85PC81201. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013888.

Initial screenings of enrichment cultures of coal storage area soils have identified cultures capable of degrading dibenzothiophene and benzothiophene aerobically or anaerobically. Work is now under way to identify the optimal conditions for degradation. 1 fig., 8 tabs.

47170 **(DOE/RA—50137-1) Feasibility study for the production of low/medium-Btu gas from coal for Tri-City Regional Port District.** (Dravo Corp., Pittsburgh, PA (USA)). Feb 1981. 313p. NTIS $24.00.

To determine the technoeconomic feasibility of a coal-gasification plant supplying energy to an industrial park in Illinois, Dravo examined three cases: (1) a minimum-requirement, 1.36 trillion Btu/yr, three-gasifier, low-Btu plant, (2) four variations of a 10.5 trillion Btu/yr medium-Btu plant using 21-30 gasifiers (all four schemes could be added on to the Case 1 plant), and (3) an ultimate-capacity, 10.1 trillion Btu/yr, 15-gasifier, medium-Btu facility, along with an 1100 ton/day oxygen plant. All gasifiers considered were Wellman-Galusha. Dravo recommended that the Tri-City Regional Port District, which operates the park, build the smallest coal-gas plant and allow for using low-grade landfill gas as a supplement when it becomes available. The Case 1 gas cost of $5.82/million Btu, though higher than that of the Case 2 and 3 schemes ($5.05-5.70/million Btu), is substantially lower than fuel oil prices.

47171 **(ORNL/FETEP—14) Toxicological benchmarks for synfuels characterization.** Griest, W.H.; Tomkins, B.A.; Smith, L.H.; Buchanan, M.V.; Higgins, C.E.; Epler, J.L.; Witschi, H.R. (Oak Ridge National Lab., TN (USA)). Aug 1986. Contract AC05-84OR21400. 45p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014411.

High-boiling petroleum distillates are quite different from crude coal liquids of similar boiling range and more likel hydrotreated coal liquids in their content of PAH dermal tumorigens, tumorigenicity, and mutagenicity. Refining levels our differences in the composition among the crude oils, and lesser compositional differences are observed for their refined naphthas. Differences (if any) in the toxicity of the vapors of the naphthas are likely to be small and subtle. More complex and comprehensive biological testing would be required to quantitate differences in potential health effects. However, the results suggest that the HFO/HD and VGO distillates of these petroleum crude oils are not substantially more mutagenic or tumorigenic than the undistilled petroleum crude oils, in comparison to crude coal liquids. Thus, there do not appear to be any substantial advantages to preparing and using distillate fractions (at least of these) petroleum crude oils as benchmarks for comparative mutagenicity and tumorigenicity testing. The original data in the literature on unfractionated petroleum crude oils appear suitable for comparison with coal liquids. The concentrations of selected four- to six-ring PAH dermal tumorigens in the high boiling distillate fractions of lighter petroleum crude oils were found to be only ca. 2.5 times more concentrated than in the undistilled crude oils. Further, these PAH in the distillate fractions were at least one to two orders of magnitude lower than in crude coal liquids of comparable boiling range, and more similar to those of hydrotreated coal liquids. 26 refs., 2 figs., 12 tabs.

47172 **(ORNL/FMP—86/5) Consolidated bibliography of publications of the advanced research and technology development (AR and TD) Fossil Energy Materials Program, October 1, 1979-April 30, 1986.** Carlson, P.T. (comp.). (Oak Ridge National Lab., TN (USA)). Aug 1986. Contract AC05-84OR21400. 105p. NTIS, PC A06/MF A01; GPO Dep. File Number DE86014336.

The objective of the Advanced Research and Technology Development (AR and TD) Fossil Energy Materials Program is to conduct long-range research and development that addresses the materials needs of fossil energy systems, including materials for coal preparation, coal liquefaction, coal gasification, heat engines and heat recovery, coal combustion systems, fuel cells, magnetohydrodynamics, and oil shale processing. Materials research that addresses materials problems generic to several fossil energy technologies is emphasized. This consolidated bibliography of publications of the AR and TD Fossil Energy Materials Program covers those publications issued under the auspices of the Program from October 1, 1979 through April 30, 1986. The publications contained in this document have been limited to (1) topical reports, (2) open literature publications in refereed journals, (3) full-length papers in published proceedings of conferences, (4) full-length papers in unrefereed journals, and (5) books and book articles. Each of the above types of publication is divided in Part II into three principal materials categories: (1) metals and alloys, (2) structural ceramics, and (3) refractories. Furthermore, each of the materials areas is subdivided into technology or discipline categories which represent principal areas of materials research and experience in fossil energy systems. Part III contains a listing of the bibliography according to performing organization.

47173 **(ORNL/TM—10066) Evaluation of selected elastomer O-ring pump seals for service at the Wilsonville, Alabama, Advanced Coal Liquefaction Research and Development Facility.** Skena, C.C.; Keiser, J.R. (Oak Ridge National Lab., TN (USA)). Aug 1986. Contract AC05-84OR21400. 24p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014414.

Previous laboratory tests of elastomer O-rings in coal liquefaction solvents conducted at L'Garde, Inc., indicated that certain ethylenepropylenediene monomer (EPDM) compounds provided the best performance when a backup ring was used to limit swelling. Before service testing in a pump at the Wilsonville, Alabama,

Advanced Coal Liquefaction Research and Development Facility, tests of six selected elastomers in the appropriate Wilsonville-produced solvent were conducted at Oak Ridge National Laboratory (ORNL). The ORNL tests measured the elastomers' changes in cross section, weight, density, and relative flexibility. Although two perfluoroelastomers showed less degradation of most properties during these tests, it was decided to proceed with service testing of two EPDM elastomers because of their much lower cost. 5 refs., 14 figs., 7 tabs.

47174 **(PB—86-203296/XAB) Process description of the WyCoalGas gasification project. Topical report.** Skinner, F.D.; Meserole, N.P. (Radian Corp., Austin, TX (USA)). Jan 1986. 135p. NTIS, PC A07/MF A01.

The WyCoalGas project involved the design, construction, and operation of a surface mine and coal-gasification plant (based on the use of Lurgi and Texaco gasification) to produce 300 million scfd of substitute natural gas from Wyoming subbituminous coal. The original plant design was later reduced to half this size, with some plant systems having the full-scale capacity due to sparing. The project was eventually terminated. However, much of the design and permitting work had been done, and these results, although incomplete, were published. The document gives the available information and data on the WyCoalGas plant with emphasis on environmental and health aspects. The presentation, which is the third in a series of documents, is arranged for ease of comparison of the plant configurations of and EH&S data from other coal-gasification plants included in the study.

47175 **(PNL—5375) Separation of gas mixtures by supported complexes.** Nelson, D.A.; Lilga, M.A.; Hallen, R.T.; Lyke, S.E. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1986. Contract AC06-76RL01830. 75p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014946.

The goal of this program is to determine the feasibility of solvent-dissolved coordination complexes for the separation of gas mixtures under bench-scale conditions. In particular, mixtures such as low-Btu gas are examined for CO and H_2 separation. Two complexes, $Pd_2(dpm)_2Br_2$ and $Ru(CO)_2(PPh_3)_3$, were examined in a bench-scale apparatus for the separation of binary (CO-N_2 or H_2-N_2) and quinary (H_2, CO, CO_2, CH_4, and N_2) mixtures. The separation of CO-N_2 was enhanced by the presence of the palladium complex in the 1,1,2-trichloroethane (TCE) solvent, especially at high gas and low liquid rates. The five-component gas mixture separation with the palladium complex in TCE provided quite unexpected results based on physical solubility and chemical coordination. The complex retained CO, while the solvent retained CO_2, CH_4, and N_2 to varying degrees. This allowed the hydrogen content to be enhanced due to its low solubility in TCE and inertness to the complex. Thus, a one-step, hydrogen separation can be achieved from gas mixtures with compositions similar to that of oxygen-blown coal gas. A preliminary economic evaluation of hydrogen separation was made for a system based on the palladium complex. The palladium system has a separation cost of 50 to 60 cents/MSCF with an assumed capital investment of $1.60/MSCF of annual capacity charged at 30% per year. This assumes a 3 to 4 year life for the complex. Starting with a 90% hydrogen feed, PSA separation costs are in the range of 30 to 50 cents/MSCF. The ruthenium complex was not as successful for hydrogen or carbon monoxide separation due to unfavorable kinetics. The palladium complex was found to strip hydrogen gas from H_2S. The complex could be regenerated with mild oxidants which removed the sulfur as SO_2. 24 refs., 26 figs., 10 tabs.

47176 **An overview of DOE/METC coal projects and their application to petrochemicals production.** Wilson, J.S.; Halow, J.S.; Ghate, M.R. New York, NY; American Institute of Chemical Engineers (1986). 24p. (CONF-860447—).

From American Institute of Chemical Engineers spring national meeting; New Orleans, LA, USA (6 Apr 1986).

The coal resource of the United States is the largest domestic source of energy available to meet future energy needs. Exploitation of this resource in an economical and environmentally acceptable manner, however, will require development of a variety of coal conversion and utilization technologies. Coal gasification is a versatile process and is a key component in many of the promising new coal utilization technologies. For electric power generation, the integrated gasification combined-cycle (IGCC) and gasification systems integrated with advanced cycles have the potential to offer high efficiency, low capital cost, and environmentally superior power generation technologies. The versatility of coal gasification extends beyond power generation. The success of the Tennessee Eastman Corporation in producing acetic anhydride from coal shows the potential of gasification as a route to chemical feedstock. There is also a potential for producing new fuels for transportation, industrial and residential heating, and for producing low-cost hydrogen. Limitations on achieving these goals today are the economics of these systems. Better understanding of coal gasification and gas cleanup, separation and upgrading techniques will undoubtedly improve the economics of these systems.

47177 **The Great Plains Coal Gasification Project status.** Bodnaruk, B.J. (U.S. Dept. of Energy, Chicago Operations Office, Argonne, IL). pp 103-109 of Technical economics, synfuels and coal energy - 1986. Dicks, J.B. New York, NY; American Society of Mechanical Engineers (1986). (CONF-860201—).

From Energy-sources technology conference and exhibition; New Orleans, LA, USA (23 Feb 1986).

The Great Plains Gasification Project is the first commercial-sized plant to produce substitute natural gas from coal in the United States. The plant is designed to convert 14,000 tons/D of North Dakota lignite into 137.5 million standard cubic feet of gas per day. The plant construction has been successfully completed per original design on schedule and on budget. The plant has also been successfully turned over from the construction to operations, as per original plan. With the completion of the capital projects being implemented at the plant, plans are to achieve 70% stream factor in the first year of production (1985). The DOE-Chicago Operations Office has been assigned the responsibility for monitoring the Project's performance against baselines of cost, schedule and technical criteria. During the start-up phase of the Project, significant technological advancements have been made and considerable knowledge has been gained, both by the operators and DOE (considering this to be a first of a kind plant built in the U.S.).

47178 **Studies of the pyrolysis of hydroaromatic compounds with an emphasis on reactions of ortho-quinodimethanes.** Scribner, M.E. Ames, IA; Iowa State Univ. (1985). 225p. University Microfilms Order No. 86-04,518.Contract W-7405-ENG-82.

Thesis (Ph. D.).

The flash vacuum pyrolysis of 4-methylbenzocyclobutene and benzocyclobutene-1,1-d_2 affords labeled styrenes which require the intermediacy of substituted arylcarbenes and cycloheptatetraenes. A deuterium isotopes effect of 2.2 is found for the C-H insertion reaction of one of the intermediate carbenes. Methyl substituents on the aromatic ring of the arylcarbenes influenced the direction of the migration of the carbene towards the closest methyl substituent. The liquid phase pyrolysis of benzocyclobutene in a high pressure atmosphere of hydrogen gas produces ortho-xylene. The pyrolysis of cyclopentadiene in hydrogen gas produces cyclopentene and cyclopentane. The pyrolysis of benzocyclobutene in deuterium gas produces ortho-xylene with greater than 90% d_2 incorporation. The author interprets the evidence as indicating that hydrogen is adding in a unimolecular fashion across the diene system of ortho-xylylene in a [4 + 2] manner. Results from the pyrolysis of 1,2-dihydronaphthalene and ortho-divinylbenzene indicate that the ortho-quinodimethane, 2,3-dihydronaphthalene, cannot be trapped via intra- or inter-molecular Diels-Alder reactions. The presence of 1,2-dihydronaphthalene in the pyrolyzate resulting from the pyrolysis of ortho-divinylbenzene offers possible evidence for 2,3-dihydronaphthalene. The pyrolysis of simple hydroaromatic compounds over active packings such as oxidized copper, zeolite, charcoal and carbon pellets leads to dehydrogenated products and in most cases, fully aromatized ones. It was concluded that quartz chips which were cleaned by flowing O_2 gas over the heated chips provided a satisfactorily inert surface.

0105 By-products

REFER ALSO TO CITATION(S) 47176, 47234

0106 Properties

REFER ALSO TO CITATION(S) 47151, 47164, 47198, 47210

47179 **(BMFT-FB-T—86-033) Rapid method for monitoring the sulphur content in moving streams of raw brown coal. Final report.** Koenig, R.; Heide-Weise, H.; Sieglen, R.A.; Faber, W.; Wolfrum, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 73p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752557.

For monitoring the sulphur content of raw brown coal on conveyor belts with a throughput of up to 15,000 t/h, a sampling and analysis system was examinated. This system uses the dust e.g. taken on belt discharge points as a sample for the consecutive analysis. The working program included the following essential points: - experimental determination of a representative grain fraction in the range of dust (<300 μm grain size) of a raw brown coal sample, - tests of the sampling system in an opencast mine and the comparison with reference samples from the conveyor belt, - examination of special methods for the determination of moisture, for drying and for analyzing, - design of a prototype for the complete analysis system. The tests in an opencast mine showed that there is a dust fraction with a sulphur content representative for that of the whole sample. The transport of the sample in the whole system was not disturbed by the high watercontent of the raw brown coal. A suitable method of analysis seems to be the X-ray with isotopic excitation. Based on the results obtained so far, the design of a prototype with an analysis cycle time <= 90 s has been worked out. With 7 tabs., 29 figs.

47180 **(DOE/FE/60181—2093) Organic structure. Final report for the period ending March 31, 1986.** Olson, E.S.; Diehl, J.W. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 27p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014276.

Molecular weight determinations have been performed (using low-angle laser light scattering photometry) on derivatives of a series of humic acid macromlecules derived from lignite. The humate derivatives oabtained from Beulah lignite by base extraction have molecular weights ranging from 1.3×10^6 to 4.3×10^5 daltons, from low and high yield extractions respectively. Mild oxidation with p-nitroperbenzoic acid gave humic acids with slightly larger molecular weights, again inversely proportional to the yields. The nature of the aliphatic bridging groups in low-rank coals has been investigated by ruthenium tetroxide oxidations using isotope dilution GC/MS methods for analysis of the product carboxylic acids derived from oxidation of the aromatic portions of the coal. The oxygen content of coals was studied using a new spectroscopic technique, high resolution x-ray fluorescence spectroscopy. This methods was investigated for direct quantitative oxygen analysis as well as for characterization of the type of oxygen bonds in coal. The content of several of the original plant substructures, such as cellulose, lignin, and waxy materials, was investigated. 21 refs., 1 fig., 10 tabs.

47181 **(DOE/FE/60181—2094) Distribution of inorganics. Final report for the period ending March 31, 1986.** Hurley, J.P.; Steadman, E.N.; Kleesattel, D.R. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 63p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014277.

The objectives of the Distribution of Inorganics project were basically threefold. One objective was to develop methods for quantifying the inorganic associations within a coal sample. A second objective was to determine the distribution and variability of the inorganic matter within coal seams. The third objective was to develop a means to describe and quantify the macroscopic and microscopic organic (petrographic) components within a low-rank coal seam so that subsequent work could build on the methods developed in relating associations of inorganics and their variability to the petrographic components of coal. Two principal methods were developed to quantify the inorganic elements in coals according to association. One method, termed chemical fractionation, uses extractions with mild reagents to quantify the inorganic elements according to several modes of occurrence, i.e., ion exchangeable, organically complexed, acid soluble minerals, and acid insoluble minerals. A second method of quantifying coal inorganic matter (according to mineral phase) uses a Scanning Electron Microscope (SEM) point-counting method to quantify the individual minerals in the coal. The variations in the elemental content within coal seams were determined by analyzing samples taken along stratigraphic sequences within coal seams by neutron activation analysis. The elements were classified according to their concentrations in the margins of the seams, center of the seams, or having no discernible pattern in their variations. Finally, a method was developed for classifying the petrographic components of low-rank coals according to component morphology, reflectance, and fluorescence. 100 refs., 9 figs., 12 tabs.

47182 **(DOE/FE/60181—2096) Physical properties and moisture. Final report for the period ending March 31, 1986.** Schobert, H.H.; Neumann, R.M.; Tye, C.; Bale, H.D.; Hauserman, W.B. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 83p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014279.

There are three major goals of this research project. The first is to develop methodologies and data on mechanical properties of crushed and finely ground low-rank coals and their mineral residues, relevant to their behavior and handling problems in gasification, liquefaction, and slurry transport applications. These properties include: shear strength, compressibility and permeability of dry, free-sliding coal; abrasiveness of finely ground coal and mineral residues in slurries; viscosity of coal and residue slurries in water and in coal-derived liquid products; porosity, defined as size distribution and continuity of pores and their variation through processing steps; mechanical and thermal friability; and shear and compressive strength of cokes or chars formed by devolatilization of coals. The second research goal is to relate observed mechanical or physical properties, such as elasticity, plasticity, or internal friction, to the three-dimensional structural arrangement of the coal macromolecules via the theories and models of polymer science. The third research goal is to determine the distribution and modes of incorporation of water in low-rank coals, and develop approaches for the measurement of "moisture" which can be interpreted in ways meaningful for low-rank coal utilization. 64 figs., 4 tabs.

47183 **(DOE/PC/70782—7) Electron spin mapping of coal molecular structure by ENDOR. Quarterly technical progress report.** Belford, R.L. (Illinois Univ., Urbana (USA)). 15 Apr 1986. Contract FG22-84PC70782. 5p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014025.

Since the frequencies of modulation of the electron spin echo decay envelope correspond to those of ENDOR transitions, time domain spin echo data can be converted into an ENDOR-like spectrum with appropriate mathematical treatment. Typically this treatment has been Fast Fourier Transformation (FFT). However, because of several unique aspects of electron spin echo spectroscopy this method may be inadequate. We have investigated some of the other methods available as well as ways of adapting FFT for use with spin echo data and in this report we summarize some of our recent work in these areas. 5 refs., 3 figs.

47184 **(DOE/PC/70791—T4) Studies in chemical and electrochemical coal conversion. Technical progress report, August 1, 1985-January 31, 1986.** Kubiak, C.P. (Purdue Univ., Lafayette, IN (USA). Dept. of Chemistry). 1986. Contract FG22-84PC70791. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013276.

Carbon dioxide is the world's most abundant potential single source of carbon. The chemistry of CO_2 is also of fundamental importance to a broad range of coal conversion technologies. The activation and reduction of carbon dioxide are also areas of intense

fundamental research interest. The preparation, structure, and N-alkylation chemistry of the "cradle" type complex $Ni_2(\mu\text{-}CNMe)(CNMe)_2(dppM)_2$, [1], (dppM) = bis(diphenylphosphino methane) were recently described by us. We now report the role the nucleophilicity of the μ-methyl isocyanide ligand of complex [1] plays in activating the CO_2 molecule. We also report the $2e^-$ redox chemistry of [1]. Together, the chemical and electrochemical characteristics of [1] provide an interesting opportunity for electrochemically induced CO_2 activation.

47185 (DOE/PC/80533—T3) Structural characterization/correlation of calorimetric properties of coal fluids. Third quarterly report, March 1-May 31, 1986. Starling, K.E.; Mallinson, R.G.; Lee, L.L.; Li, M.H.; Peters, M.W.; Hulvey, R.D. (Oklahoma Univ., Norman (USA). School of Chemical Engineering and Materials Science). 1986. Contract FG22-85PC80533. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013588.

The proposed correlation frameworks for calorimetric properties of coal fluids have been tested for model binary mixtures. For calculating the calorimetric property for real fluids, one needs to calculate (1) departure function from equation of state and (2) ideal gas calorimetric property. The binary systems of n-pentane-tetralin, n-pentane-t-decalin and n-octane-benzene were selected for test. The enthalpy calculations were performed based on the following two cases: Case I. the literature ideal gas enthalpies were used in the calculation. This is mainly to test the equation of state capability of estimating the enthalpy departure function. Case II. the ideal gas enthalpies were calculated by Benson group contribution method. 3 refs., 2 figs., 2 tabs.

47186 (EUR—10366-EN) Certification of the contents (mass fraction) of carbon, hydrogen, nitrogen, chlorine, arsenic, cadmium, manganese, mercury, lead, selenium, vanadium and zinc in three coals. Gas coal CRM No. 180; Coking coal CRM No. 181; Steam coal CRM No. 182. Griepink, B.; Colinet, E.; Wilkinson, H.C. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1986. 172p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

BCR information.

The report first describes the preparation of three coal reference materials: Gas coal (BCR No. 180), Coking coal (BCR No. 181) and Steam coal (BCR No. 182). It deals further with the homogeneity and stability tests for major, minor and trace components. The contents (mass fractions) of the elements: C, H, N, Cl, As, Cd, Mn, Hg, Pb, Se, V and Zn are certified. The analytical techniques used in the certification are summarised. All the individual results are given and recommendations for analysis are made.

47187 Relationship between chemistry and rheology in coal-water slurries. Chapman, R.N.; Lynch, A.W. New York, NY; American Institute of Chemical Engineers (1986). 13p. (CONF-860447—).

From American Institute of Chemical Engineers spring national meeting; New Orleans, LA, USA (6 Apr 1986).

Rheology is a critical performance specification for coal-water slurries. The primary role of additives is to modify rheology and to optimize performance. The effect of an additive is dependent on the chemical interactions between the additive, the surface of the coal, and the slurry liquor. Using a novel Helical Screw Rheometer developed at Sandia, which functions as a small-scale flow loop, the authors measure rheology in situ and withdraw slurry samples as functions of time. They use fresh coals that have been stored under inert atmosphere after being mined. Since unweathered coals are fairly reactive, the coal surface and slurry liquor change with time. Through extensive analyses of the coal surface and slurry liquor, they determine that chemical changes have taken place, and for two coals (bituminous and sub-bituminous) and several additives (nonionic and anionic), they determined the nature of these chemical changes and how they affect rheology.

47188 Comparison of a nonionic surfactant and an anionic dispersant as coal water additives. Casassa, E.Z.; Toor, E.W.; Atlas, H. New York, NY; American Institute of Chemical Engineers (1986). 13p. (CONF-860447—).

From American Institute of Chemical Engineers spring national meeting; New Orleans, LA, USA (6 Apr 1986).

Coal slurry behavior depends upon particle surface charge and degree of wetting. The effects on slurry properties of a nonionic surfactant which decreases slurry liquid surface tension, and of an anionic dispersant which decreases particle hydrophobicity, are examined in relation to coal ash content and oxidation history. Observation of electrophoretic mobility and other properties of concentrated coal suspensions, with and without additives, improves understanding of the mechanisms by which additives affect slurry properties.

47189 Analytical applications of ultrasensitive polarization measurements. Bobbitt, D.R. Ames, IA; Iowa State Univ. (1985). 202p. University Microfilms Order No. 86-04,449.Contract W-7405-ENG-82.

Thesis (Ph. D.).

Recent advances in the measurement and utilization of the polarization properties of light are presented. Since optical activity is usually an indication of biological activity, past or present, optical rotation detection (ORD) can impart a unique selectivity to the chromatographic analysis of complicated geochemical samples. The advantages of selective detection will be demonstrated for several coal liquids, and LC-ORD will be shown to be useful for the fingerprinting of coals as well as for following the degree of processing of a fossil fuel. Microcolumn technology using a micropolarimeter was used for this work. When an optically active solvent is used with the micropolarimeter, optically inactive analytes can be detected as they elute from a microcolumn. This technique, termed indirect polarimetry, has converted the very selective micropolarimeter into a sensitive universal detection scheme superior to the conventional refractive index detector. Additionally, it will be shown that indirect polarimetry can be used to detect analyte absorptions with excellent sensitivity. The theoretical and experimental considerations necessary to obtain simultaneous selective, universal and absorption information will be discussed. Raman spectra can be obtained by monitoring the polarization properties of a probe field while it interacts with a Raman shifted pump field. An analytical investigation of this technique, the Raman induced Kerr effect will be presented, along with a unique optical null capable of suppressing spectral and nonresonant background interferences.

47190 Structural variations in coal macerals: application of two-dimensional and dipolar dephasing ^{13}C-NMR techniques. Pugmire, R.J.; Woolfenden, W.R.; Mayne, C.L.; Karas, J.; Grant, D.M. (Univ. of Utah, Salt Lake City). *ACS Symposium Series;* 79-97(1984). Contract FG22-80PC30226.

Cross-polarization magic-angle spinning, dipolar dephasing, and two-dimensional dipolar dephasing carbon-13 NMR techniques were used to study structural variations in coals and coal macerals. The macerals were separated by density-gradient centrifugation. Data on 36 coal and maceral samples are given. Aromatic carbons, bridgehead carbons, and aliphatic carbons were distinguished.

47191 Preliminary studies on the aromaticity of Australian coals. Russell, N.J.; Wilson, M.A.; Pugmire, R.J.; Grant, D.M. (CSIRO Div. of Fossil Fuels, North Ryde, Australia). *Fuel;* 62: 601-605(May 1983). Contract FG22-80PC30226.

The aromaticities of samples from nine Australian coal seams, including pairs of hand-picked vitrains and durains, were determined by carbon-13 CP/MAS NMR spectroscopy. The results clearly show that the aromaticity of the coals increases with increase in vitrinite reflectance and carbon content and decrease in atomic H/C ratio. For a given coal seam, durain (inertinite-rich coal) has a higher aromatic value than vitrain (vitrinite-rich coal). The trends for carbon content and atomic H/C are in good agreement with results from North American coals; however, the aromaticities of Australian coals obtained in this study appear to be slightly lower than some of those reported for North American coals of similar carbon content.

0108 Waste Management

REFER ALSO TO CITATION(S) 47161, 47205, 47483, 48663

47192 **(EPRI-CS—4699-Vol.1) FGD maintenance guidelines. Volume 1. FGD maintenance programs. Final report.** Davidson, L.N.; Miller, G.P.; Wedig, C.P.; Slack, A.V. (Stone and Webster Engineering Corp., Boston, MA (USA); SAS Corp., Sheffield, AL (USA)). Jul 1986. 313p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920417.

The "FGD Maintenance Guidelines" was written to fill a need for maintenance information that applies specifically to flue gas desulfurization (FGD) systems. Previously there was no single source of data describing FGD maintenance. Usually maintenance managers relied on suppliers' operating and maintenance manuals, past FGD experience, or procedures from other areas of a power plant. There are two volumes in the "Guidelines," intended to assist utility personnel in planning and performing maintenance for FGD systems. Different aspects of maintenance are emphasized in each volume. Volume 1, FGD Maintenance Programs, provides guidance for supervisory personnel involved in planning maintenance. It describes the utility industry's experience with FGD maintenance programs, a procedure for organizing and managing maintenance programs, and ways to design FGD systems for maintainability. The section about implementing a maintenance program contains a detailed example illustrating the procedure, based on experience of an actual operating FGD system. 12 refs., 19 figs.

47193 **(PB—86-215613/XAB) Literature searches on metal recovery by leaching and carbothermic reduction.** Hassett, D.J.; Mitchell, M.J. (North Dakota Univ., Grand Forks (USA). North Dakota Mining and Mineral Resources Research Inst.). Apr 1985. 205p. NTIS, PC A10/MF A01.

Literature searches were done on methods for metal recovery by leaching and carbothermic reduction. The focus of these searches was the recovery of metals (primarily aluminum) from low-rank coal combustion and gasification ash. The final compilation included bibliographies, in-house generated computer searches, and manual searches.

0109 Environmental Aspects

REFER ALSO TO CITATION(S) 48697

47194 (CONF-841187—Vol.1, pp 389-401) **Health and environmental aspects of the Great Plains Coal Gasification Facility.** Joseph, T. (Chicago Operations Office, Argonne, IL). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Great Plains Coal Gasification facility represents the first commercial scale coal gasification plant in the US. There are numerous environmental and health related questions and concerns associated with the development of coal conversion processes, and there is relatively little direct information available to answer these questions. The Department of Energy's (DOE's) involvement with the project through a Loan Guarantee Agreement (LGA) afforded DOE an opportunity to direct additional health and environmental studies above and beyond those required to comply with Federal, State, and local laws and permits. The environmental monitoring program for this facility falls into three categories: compliance monitoring, voluntary monitoring (monitoring not required by law or permit), and supplemental monitoring (the study program directed by DOE). Together they form the complete environmental monitoring program for the facility. The supplemental monitoring program builds upon and is often the extension of other monitoring programs and comprises three study areas including: pollution control performance and trace element distribution; toxicology and epidemiology; and environmental. This paper discusses the environmental monitoring program underway at the facility, concentrating on the supplemental monitoring program. It also discusses briefly how the supplemental program was developed. 1 reference, 1 figure, 1 table.

47195 (CONF-841187—Vol.2, pp 723-735) **Clean Water Act and biological studies at the Savannah River Plant.** Fleming, R.R. (Savannah River Lab., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC09-76SR00001.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Federal facilities are required to comply with applicable water quality standards, effluent limitations, and permit requirements established by the EPA or agreement state pursuant to provision of the Federal Water Pollution Control Act, as amended in 1977 (P.L. 95-217). Production reactors and a large fossil-fueled powerplant at the Savannah River Plant (SRP) use either once-through water from the Savannah River or recirculating water from 2700-acre reservoir to remove waste heat. Once through cooling water is discharged directly to streams whose headwaters originate on the plant. The thermal load carried by these streams is largely dissipated by the time the streams re-enter the river. However, effluent discharge temperatures to the streams and reservoir do not meet current criteria specified by the State of South Carolina for a National Pollutant Discharge Elimination System (NPDES) permit. Less stringent effluent limitations can be approved by the State if DOE can demonstrate that current or mitigated thermal discharges will ensure the protection and propagation of a balanced biological community within the receiving waters. Following information provided in the EPA 316(a) Technical Guidance Manual, biological studies were designed and implemented that will identify and determine the significance of impacts on waters receiving thermal effluents. Sampling is being conducted along the length of each thermal stream, in the cooling water reservoir, and along a 160-mile stretch of the Savannah River and in the mouths of 33 of its tributaries. Preliminary results of the 316(a) type studies and how they are being used to achieve compliance with State water quality regulations will be discussed.

0120 Mining

47196 **Dragline operator training simulator.** Contor, M. (Southern Illinois Univ. at Carbondale, Carbondale, IL). pp 20 of Third annual program of coal review abstracts. Carbondale, IL; Southern Illinois University Press (1982). (CONF-8204205—).

From 3. annual program of coal review; Carbondale, IL, USA (21 Apr 1982).

The presentation describes and documents the dragline operation simulation training program conducted at the Department of Energy facilities at Carterville, Illinois during the summer of 1981. The evaluation and verification of the dragline simulation program consisted of using two groups of mining personnel, as trainees, to evaluate three hands-on training devices, audio visual material and self paced student workbooks. Each training session was two weeks in duration and the student's progress was determined by written and performance evaluation techniques. A detailed description of the simulator, trainers, and classroom material is provided. The results, conclusions, and recommendations of the verification program are outlined and discussed. The current and future status of the dragline simulator program for operator training, mine supervisory training and academic course work for mining students are covered.

0130 Transport And Handling

REFER ALSO TO CITATION(S) 47172, 47179, 47188, 48289

47197 **(DOE/FE/60181—2091) Fine coal cleaning. Final report for the period ending March 31, 1986.** Brown, D.J. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1986. Contract FC21-83FE60181. 13p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014274.

Washability data on coals from the western United States is generally very limited and their response to standard washing techniques cannot be predicted. To expand the data base, the Department of Energy initiated a washability study for both conventional

and fine-size ranges of western coals. The Pittsburgh Energy Technology Center (PETC) performed float-sink washability testing on 156 western coals crushed to 1 1/2" x 0, 3/8" x 0, and 14 mesh x 0. The University of North Dakota Energy Research Center (UNDERC) performed centrifugal float-sink washability resting on 61 of those 156 test coals crushed to 65 mesh x 0. In addition, 35 of the 65 mesh x 0 coals were further reduced to 200 mesh x 0 and tested, and three coals were pulverized to 325 mesh x 0 and tested. Generally, the higher-ranked coals were most amenable to the gravity separation technique. Pulverized of study coals to finer grain size distributions did not significantly improve the coal's Washabilities, as float ash content of 200 mesh x 0 and 325 mesh x 0 samples were generally similar to 65 mesh x 0 float ash content. UNDERC also investigated the applicability of oil agglomeration and froth floatation on the benefication of four selected economically important western coals. In general, these tests were not as successful at beneficiating western coals as the standard float-sink technique, which provided the highest degree of ash separation at the highest weight yields. This final report summarizes work completed on the float-sink washability data base, oil agglomeration testing, and froth flotation testing at UNDERC from May 1983 through March 1986. 12 refs., 1 fig., 1 tab.

47198 **(DOE/PC/70003—T10) Coal pretreatment for two stage liquefaction. Quarterly report, April 1-June 30, 1986.** Derbyshire, F.J.; Luckie, P.T. (Pennsylvania State Univ., University Park (USA). Coll. of Earth and Mineral Sciences). 1986. Contract FG22-84PC70003. 29p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014031.

Efforts have been continued to examine the utility of liquid-liquid separation for the pretreatment of subbituminous coals. Reasonable separations have been obtained in terms of yield, the enrichment of reactive macerals and the rejection of mineral matter when using a coal-derived distillate as the nonaqueous medium. An investigation of the influence of reaction conditions on temperature-staged catalytic liquefaction has been continued using tubing bomb reactors. With fixed second stage conditions (425°C, 10 min), a survey has indicated that, for a subbituminous coal, first stage reaction at 275°C and 30 min gives good overall conversion and a high-oil to asphaltene ratio. Using these conditions for the first stage, a survey has now been started to examine the influence of the second stage conditions on the net product distribution. Preliminary results show that higher oil yields are obtained at 450 than at 425°C without incurring excessive production of light hydrocarbon gases. Some studies have been made to examine the effect of catalyst concentration on temperature-staged liquefaction. Reducing the Mo concentration from 1.0 to 0.1% wt lowered the overall conversion by 7% and the oil yield by about 4%. The influence of solvent composition upon temperature-staged liquefaction has been studied using six distillate solvents supplied by Conoco Coal Research. Reactions were conducted in the 300 cc stirred autoclave using both subbituminous and bituminous coals. Preliminary data are presented and discussed. 5 refs., 2 figs., 8 tabs.

47199 **(IS-M—574) Coal deashing and desulfurization utilizing microwave irradiation at 2450 MHz.** Bluhm, D.D.; Markuszewski, R.; Richardson, C.K.; Fanslow, G.E.; Durham, K.S.; Green, T. (Ames Lab., IA (USA)). 1986. Contract W-7405-ENG-82. 11p. (CONF-860984—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86011398.

From British national committee for electroheat, heating, and processing conference; Cambridge, UK (23 Sep 1986).

An Experimental Microwave Applicator System has been constructed and tested for the cleaning of 50-g samples of coal using caustic treatment and microwave irradiation. At the present time, best results were obtained in the removal of ash by mixing one part of the coal with 2 parts of dry caustic, adding 10% water, and irradiating at 1.0 to 1.5 kW for 1 to 2 minutes. For the removal of significant amounts of sulfur, multiple treatment and further refinements in the procedure are required. 6 refs., 5 figs.

47200 **Use of coal liquid derivatives for preparation and stabilization of coal-water slurries.** Resavan, S.K.; Schruben, D.L. New York, NY; American Institute of Chemical Engineers (1986). 17p. (CONF-860447—).

From American Institute of Chemical Engineers spring national meeting; New Orleans, LA, USA (6 Apr 1986).

As the supply of fuel oil becomes insecure, it is anticipated that coal will capture a significant fraction of future energy growth. However, complete conversion of oil-fired facilities to coal would involve substantial capital expenditure. Coal-water slurry fuels can be used as a replacement for fuel oil in industrial facilities with only modest retrofits of existing equipment. These hybrid fuels offer a potential material cost advantage per Btu over neat fuel oil.

0140 Combustion

REFER ALSO TO CITATION(S) 47172, 47869, 47872

47201 **(CONF-860535—2) Mechanism of deposition in coal-fired gas turbine systems, October 1, 1985-October 1, 1986.** (Argonne National Lab., IL (USA)). 1986. Contract W-31-109-ENG-38. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014595.

From 3. annual heat engines contractors' meeting; Morgantown, WV, USA (6 May 1986).

The objective of this task is to develop mathematical models which describe ash particle and vapor formation and transport in coal-fired gas turbines. These will characterize the important surface deposition phenomena on turbine blades and assess the effects of coal pretreatment and the range of operating conditions on turbine performance. This report presented some fine tuning of the deposition processes in a coal-fired gas turbine. The boundary layer nucleation theory gives the correct trends. The probabilistic sticking coefficient model agrees quite well with the experimental data. The gas phase simulations glean insight into the mechanism of SO_3 and Na_2SO_4 production. Much work remains in these last two: particle adhesion model refinement, and heterogeneous formation of Na_2SO_4. The first of these two depends strongly on the availability of data. It would be highly desirable to assist implementation of new experiments that would vindicate the model. The second of these entails the complications of adsorption onto particles or blades, surface diffusion, surface reaction, and possibly desorption. Laboratory-scale experiments are required to quantify both of these steps. 11 refs., 7 figs., 2 tabs.

47202 **(CONF-860940—1) Measurement of alkali vapor in PFBC flue gas and its control by a fixed granular bed of activated bauxite.** Lee, S.H.D.; Myles, K.M. (Argonne National Lab., IL (USA)). 1985. Contract W-31109-ENG-38. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86005551.

From Gas cleaning at high temperatures conference; Guildford, Surrey, UK (16 Sep 1986).

A fixed granular-bed sorber, with regenerable activated bauxite as the sorbent, for the control of the alkali vapor in the flue gas produced during pressurized fluidized-bed combustion (PFBC) of coal is being developed. In a gas stream closely simulating the actual PFBC flue gas, activated bauxite is shown to capture NaCl vapor by (1) chemical fixation of the vapor with the intrinsic clay minerals, probably to form thermally stable, water-insoluble sodium aluminosilicates and (2) chemical conversion of NaCl vapor into a condensed-phase sodium sulfate, which has a much lower vapor pressure than does NaCl. The latter predominates the capture process, and the captured sodium sulfate can be easily removed by simple water-leaching to restore the porosity of activated bauxite for reuse. A high-temperature ($\leq$ 900°C) and high-pressure ($\leq$ 10 atm) laboratory-scale, fixed, granular-bed alkali sorber has been operated with the Argonne National Laboratory PFBC combustor to (1) measure the alkali vapor concentration in the PFBC flue gas on a real-time, on-line basis, and (2) demonstrate the alkali sorber for the control of alkali vapor from an actual PFBC flue gas. The alkali (Na + K) vapor concentration in particulate filtered hot flue gas was measured to be $<$10 ppbW with the Ames analyzer. The same measurement with the APST was higher between 90 to 170 ppbW. Therefore, the possibility of sink for sodium vapor in the PFBC/alkali sorber system must be considered. 32 refs.

47203 **(DOE/ET/13011—T1) Operation and maintenance of DOE/PETC Combustion Test facilities. Final activity report, April 1978-December 19, 1982.** (Management and Technical Services Co., Library, PA (USA)). 1982. Contract AC22-78ET13011. 145p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86013983.

In April 1978, Management and Technical Services Company/General Electric (MATSCO/GE) was awarded the contract to operate, modify and maintain the 700 HP Combustion Test Facility at the Pittsburgh Energy Technology Center. Through the life of this contract, the goal of 700 HP Boiler test programs was to establish the feasibility of coal slurries as an alternative to fuel oil in industrial and utility boilers. This same goal was established for 100 HP Boiler testing, which came under this contract in early 1980. Beginning with the Coal-Oil Mixture (COM) program in the 700 HP Boiler, a string of successful coal slurry test programs was achieved. The coal-water mixture (CWM) program was initiated in the 100 HP Boiler in 1980 and successfully moved to the 700 HP Boiler in 1981. The 100 HP Boiler's other coal slurry project was the coal-methanol test program. The other major projects in these two test facilities were the Solvent Refined Coal (SRC) test phases I and II. Fuel transport characteristic studies in support of these main projects were established in the contract in 1981. These studies included the Coal Water Flow Test Loop to study the transport characteristics of slurries and the two Coal Flow Test Loops to study solid coal transport phenomena. These programs are all detailed in this report, along with other projects which MATSCO/GE became involved in.

47204 **(DOE/MC/21171—2069) System design study to reduce capital and operating cost of a moving distributor, AFB advanced concept - comparison with an oil-fired boiler. Final report.** Mah, C.S.; West, L.K.; Anderson, R.E.; Berkheimer, I.L.; Cahill, D.V. (Aerojet Energy Conversion Co., Sacramento, CA (USA)). Dec 1985. Contract AC21-84MC21171. 191p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE86006627.

The Aerojet Energy Conversion Company, under contract with the United States Department of Energy, has performed a comparative economic study of the Aerojet Universal Atmospheric Fluidized Bed Combustion (UAFBC) system and a coventional atmospheric fluidized bed combustion (AFBC) system. The program title, "System Design Study to Reduce Capital and Operating Cost and Bench Scale Testing of a Moving Distributor, AFB Concept," is a good description of the general objective of the program. The specific objective was to compare the UAFBC with the conventional AFBC in terms of normalized steam cost. The boilers were designed for 150,00 lb/hr of steam at 650 psig and 750°F. The reference coal used in the analysis was Pittsburgh No. 8 coal with a sulfur content of 4.3% and a higher heating value of 12,919 Bru/lb. The analysis assumed a plant life of 20 years and a discount rate of 15%. The UAFBC systems included the usual elements of the conventional cola-fired AFBC steam plant, but the coal preparation sysbaystem for the UAFBC was considerably simpler because the system can use "run-of-mine" coal. The UAFBC boiler itself consisted of a staged-combustion fluidized-bed, superimposed over a static bed, the latter supported by a moving distributor. It incorporated a fines burnup combustor, an entrained reciculating gas cleanup bed, and conventional convection boiler. The key features of the UAFBC design were: High fuel flexibility; low NO/sub x/ emission; and superior turndown capability. 30 refs., 52 figs., 12 tabs.

47205 **(DOE/MC/21289—2064) Evaluation of calcium impregnated coal as a fuel for turbine combustors. Final report, September 1984-November 1985.** Reuther, J.J.; Condle, H.N.; Webb, P.R.; Feldmann, H.F. (Battelle Memorial Inst., Columbus, OH (USA)). Apr 1986. Contract AC21-84MC21289. 95p. NTIS, PC A05/MF A01; GPO Dep. File Number DE86014207.

The objectives of this research program were two-fold: to experimentally determine the comparative in situ SO_2, NO/sub x/, and particulate-controlling capacity of calcium-doped coal under simulated combustion turbine conditions as a function of pressure, firing temperature, raw coal organic sulfur content, molar calcium/sulfur ratio, calcium source, and calcium loading technique, and to analytically determine the technical and economic feasibility of directly firing calcium impregnated coal in a combustion turbine. The calcium-doped bituminous coals consisted of high-sulfur Illinois No. 6 that had been premixed with various limes using either a proprietary Battelle process or simple physical mixing. The calcium-impregnated coal is called Battelle Treated Coal (BTC). The simulated turbine combustion conditions consisted or super-atmospheric pressure (4 to 5 atm), ultra-high excess air (10 to 15% excess oxygen), variable firing temperature (1800 to 2100°F), and high-carbon conversion (98+%). Battelle has operated a pulverized coal-fired facility that essentially simulates combustion turbine conditions. This simulator has proven to be of practical value in research concerned with the screening of coal fuels for advanced combustion turbines. Specifically, it has demonstrated that at low levels of calcium impregnation (Ca/S <2), increasing superatmospheric pressure (about 4 atm), high excess air conditions (15% excess O_2), short residence times (<250 milliseconds), and typical firing temperatures (2100°F), the use of BTC does the following during turbine combustion: improves ignition and stability, shortens char burnout time, relaxes materials problems, reduces internal deposition, reduces internal erosion, reduces internal corrosion, and simultaneously controls SO_2, NO/sub x/, and RO/sub x/ emissions. 35 refs., 12 figs., 15 tabs.

47206 **(DOE/PC/70794—7) Effect of energy feedback mechanisms on the oxidation rate of pulverized coal. Quarterly technical report, March 1-May 31, 1986.** Haussmann, G.; Krewson, S.; Kruger, C.H. (Stanford Univ., CA (USA). High Temperature Gasdynamics Lab.). Jul 1986. Contract FG22-84PC70794. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013317.

An experimental test was performed to extend the parameter range covered in the Stanford flow-tube reactor to lower gas temperatures (and thus lower particle heating rates). This experiment is intended to complement modeling efforts on the localized oxidation of pyrolysis products, particularly "tarry volatiles", during the early stages of pulverized coal combustion. Two important parameters of interest are the bulk gas oxygen concentration, and the particle heating rate. The effect of the particle heating rate is expected to be observed through its influence on the distribution and yield of pyrolysis products. The determination of this effect is the limiting factor at the current stage of this investigation, since this information is a necessary input into the diffusion-limited shrinking sphere model for tar oxidation which has been developed. This model has shown a reasonable prediction of the oxygen concentration dependence for the carbon conversion rates at one gas temperature, 1750K. The application of this model to a range of temperatures is not yet possible due to the lack of information on the effect of the heating rate (i.e., gas temperature) on the tar yield. Future efforts will be centered around the measurement of tar yields through the examination of particle samples oxidized at a variety of bulk gas temperatures. The analysis of micro-samples for carbon, hydrogen, and ash content will also be performed. The ultimate goal of this model will be to understand the carbon conversion rates observed in the Stanford flow-tube reactor, and to assess the degree to which energy feedback contributes to the high reactivities observed. 6 figs.

47207 **(DOE/PC/71504—5) Operation and maintenance of DOE/PETC combustion test facilities. Quarterly technical progress report, April 1-June 30, 1986.** (Gilbert/Commonwealth, Inc., Reading, PA (USA)). 1986. Contract AC22-85PC71504. 68p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014732.

Duties in the areas of computer data entry and data analysis were added to G/C responsibilities. Testing was conducted in all three tasks under the Alternative Fuels Research and Development Program. Both shakedown and parametric testing in the residential hot-water boiler were completed and design and modifications were begun for the next test series to be conducted in the residential warm-air furnace. Shakedown testing of the newly installed commercial cast-iron boiler was completed and parametric testing was begun. Installation of a commercial dense-phase pulverized-coal (PC) transport system and experimental PC burner in the Industrial Boilers/Furnace test facility was completed and shakedown testing was begun. In the Flue Gas Cleanup Research and Development Program, testing was completed in both the NOXSO and

Copper Oxide Process test facilities. Testing continued as directed in the Dry Injection Process PDU. Design and construction of an integrated test facility for Advanced Separation Techniques progressed. In the Advanced Research and Technology Development Program, design and construction progressed on the laser development laboratory for the Ash Effects task and the drop tube furnace facility for the Global Char Combustion Kinetics task. Responsibility for analytical chemical analyses was added to the task covering Coal Preparation and Standards Laboratory support. The Advanced Combustor Technology Program was resumed in the middle of this report period. Preparation of the slagging combustor neared completion and design of the coal-water mixture feed system and sorbent injection system continues. Testing in the Tunnel Furnace was completed under prior task requirements. Support for the Coal Preparation Testing Laboratory was provided.

0150 Marketing And Economics

REFER ALSO TO CITATION(S) 47176, 47200

47208 **(PB—86-210507/XAB) Assessment of development and production potential of federal coal leases. Volume 2. Working papers. Part E, Vol. 1. Development and production potential of undeveloped federal coal leases and preference-right lease applications in the Powder River Basin and other Wyoming coal basins: Wyoming task force report. Working paper.** Boulding, J.R.; Pederson, D.L. (Office of Technology Assessment (U.S. Congress), Washington, DC). Jun 1984. 332p. NTIS, PC A15/MF A01.

This report was written for OTA and covers development and production potential of undeveloped federal coal leases and preference-right lease applications in the Powder River basin and other Wyoming coal basins: Wyoming task force report.

47209 **(PB—86-210515/XAB) Assessment of development and production potential of federal coal leases. Volume 2. Working papers. Part 1, Vol. 2. Analysis of federal coal leases in mine plans: detailed summaries of mine plans and lease blocks in Colorado, New Mexico, and Utah.** (Office of Technology Assessment (U.S. Congress), Washington, DC). Jun 1984. 361p. NTIS, PC A16/MF A01.

This volume contains papers written for OTA to assist in preparation of the report An Assessment of Development and Production Potential of Federal Coal Leases. Analysis of Federal Coal Leases in Mine Plans: Detailed Summaries of Mine Plans and Lease Blocks in Colorado, New Mexico, and Utah.

0160 Health And Safety

REFER ALSO TO CITATION(S) 47194, 47342, 48909

47210 **(DOE/PC/62999—10) Exploratory research on mutagenic activity of coal-related materials using statistical evaluation.** Schoeny, R. (Cincinnati Univ., OH (USA). Kettering Lab.). 1986. Contract AC22-83PC62999. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010887.

Potential synergism among components of fuel-derived mixtures is being investigated by comparison of mutagenic activities of "reconstructed wholes" with the sum of mutagenic activities of individual fractions. Results of forward mutation assays of samples of Lummus Product and Lummus Feed contrasted with those obtained from reverse mutation assays. Data from assay of both materials gave indications of the likelihood of interactions among fractions contributing to increased mutagenicity. The ability of fuel sample fractions to influence biological activities of individual components is also being studied. In these mutagenicity assays 2-aminoanthracene (2AA), as a model aromatic amine, is tested in the presence of the hexane fraction of PDU-9. Data from these assays show an enhanced mutagenic response as a result of mixing these two materials. This enhancement is not solely due to bacteriotoxic effects. It is, however, probably related to metabolism of the 2AA and/or hexane fraction. The PDU-9 hexane fraction (organic solvent extract) is presently being analyzed chemically using HPLC and fluorescence techniques. Various fractions are being collected so as to identify and characterize the major peaks. These fractions will also be analyzed for their mutagenicities using the forward mutation assay. 5 figs.

47211 **(PB—86-209483/XAB) Dual-wavelength light sources. Research report, October 1982-October 1985.** Boos, R.T.; Egan, W.D.; Elliot, R.A.; DeFreeze, R.K. (Bethlehem Steel Corp., PA (USA)). Oct 1985. 162p. NTIS, PC A08/MF A01.

This is a report on research directed toward the development of a coal-mine methanometer. The project encompassed two tasks. The first was a study conducted to determine if room-temperature injection lasers could be used as the source for a DIAL methanometer for coal-mine applications. As part of that study, prior DIAL measurements of methane were reviewed and the measurement technique explored in general. The second task was the design and fabrication of an external grating cavity to reduce the bandwidth of the injection lasers.

47212 **Regional measurement of ventilation and perfusion to detect subtle lung abnormalities in coal miners.** Susskind, H.; Liu, J.; Brill, A.B. (Brookhaven National Lab., Upton, NY). *Federation Proceedings, Federation of American Societies for Experimental Biology;* **45**: No. 3, 392(1 Mar 1986). (CONF-8604222—).

From 70. annual meeting of the Federation of American Society for Experimental Biology; St. Louis, MO, USA (13 Apr 1986).

The relationship between regional pulmonary ventilation (V) and perfusion (Q) uniquely determines the amount of gas exchange that occurs in the lungs. Therefore, the pixel-by-pixel distributions of V and Q were measured with continuously inhaled Kr-81m and i.v. injected Tc-99m MAA, respectively, in a group of 71 subjects exposed to coal dust and then compared with those from a control group of 9 healthy volunteers. Each subject sat upright with his back against a large-field-of-view scintillation camera; 500,000 count images were obtained, analyzed by computer, and then displayed in a 64 x 64 matrix. Individual pixel values of V and Q were correlated by a best-fit regression line, whose slope was proportional to the overall V/Q ratio. The slopes of individual groups of nonsmokers, ex-smokers, and smokers (0.83-0.85) were significantly greater ($p < 0.02$) than the slope of the controls (0.70 +/- 0.07). In addition, the authors found that the skewness of plots of frequency distribution of V/Q and of V and Q vs V/Q for the individual patient groups was statistically different from that of the normals ($p < 0.01$). Statistical analysis of local and Q values therefore appears to be a potentially useful, non-invasive method to evaluate subtle regional lung impairment.

02 PETROLEUM

47213 **(IFP-RA—1985) Institut Francais du Petrole 1984. Annual progress report.** (Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison). 1985. 68p. (In French). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752842.

In this progress report research, development in valorization concerning exploration, exploitation, production, refining, petroleum chemistry, energy conservation, personnel training, documentation are reviewed.

0202 Geology And Exploration

REFER ALSO TO CITATION(S) 47447

47214 **(NP—6901586) Development of a predictive model for corosity distribution in the Smackover Formation of southwest Alabama. Final report, project year 1984-1985.** Benson, D.J. (Alabama Univ., University (USA). Dept. of Geology). 7 Mar 1986. 91p. School of Mines and Energy Development, Univ. of Alabama, Tuscaloosa, AL 35486. File Number TI86901586.

Analyses of samples from 108 cores indicate that the Smackover in southwest Alabama was comprised of seven different depositional lithofacies. Appreciable amounts of depositional porosity were associated only with the oolitic grainstone (30 to 40% porosi-

ty), skeletal-peloidal grainstone/packstone (10 to 20% porosity), and algal boundstone (10 to 20% porosity) lithofacies. Depositional porosity was significantly modified by post-depositional diagenesis. Primary porosity was occluded by eogenetic and mesogenetic cementation and significant amounts of mechanical and chemical compaction. Secondary porosity was created by fabric selective eogenetic dissolution, brine reflux dolomitization, and nonfabric selective mesogenetic dissolution. Ultimate porosity is one or a combination of four types: interparticulate, moldic, vuggy, and intercrystalline. Dolomitic intercrystalline porosity, which includes both simple intercrystalline porosity and oversized intercrystalline porosity formed through dissolution of included anhydrite, is the most common pore type in the Smackover of southwest Alabama. Porosity ranges from less than 5 to 22% with permeabilities of less than .1 md to 100 md. Porosity vs depth crossplots show that while porosity does decrease with increased depth, the Smackover in southwest Alabama possesses significant amounts of reservoir grade porosity (>5%) at depths as great as 18,500 feet. In general, porosity in the Smackover of southwest Alabama is most common along the updip margin of the unit and across the paleohighs. The crests and flanks of the paleohighs offer the most promise for future hydrocarbon exploration since intercrystalline, vuggy, and moldic porosity are all common across the paleohighs. 27 refs., 20 figs., 1 tab.

0203 Drilling And Production

REFER ALSO TO CITATION(S) 47226, 47441

47215 **(DOE/BC/10744—8) Reservoir characterization for numerical simulation. Final report.** Lake, L.W.; Scott, A.J.; Kocurek, G.A. (Texas Univ., Austin (USA)). Jun 1986. Contract AS19-82BC10744. 237p. NTIS, PC A11/MF A01; 1; GPO Dep. File Number DE86000285.

This report discussed the accomplishments of a research project dealing with quantitative reservoir description. The report has four major areas concerning: (1) a proposed reservoir description scheme; (2) a generalized statistical approach; (3) the connection between geology and statistics; and (4) how statistical descriptions affect fluid flow. Section III proposes the use of a power transformation to describe distribution functions. The transformation is theoretically motivated from a series or parallel arrangement of permeability layers and can be shown to encompass all of the single-population distributionss which characterize permeability. The power of the transformation can be determined only from the original data. Section III also shows that central tendency estimation and correlataion are both improved when the power transformation is used. In Section IV we attempt a correspondence between statistical indicators of permeability and geology. In two actual reservoir settings - fluvial and eolian sandstones - we found permeability to be controlled by stratification type, the primary depositional mode. The connection is quantitatively established from permeabilities measured in the field. The last section discusses two aspects of fluid displacements: the importance of the correlogram and volume averaging. We find that correlation in permeability can be used to classify mixing in displacements as flux, dissipative or capacitative dominated. The work on volume averaging shows that stabilized average fractional flow curves exist and can be used to lump point properties into grid block averages. 35 refs., 95 figs., 4 tabs.

47216 **(DOE/MC/16426—19) Mobility control for CO_2 injection. Final report, May 15, 1981-January 31, 1986.** Heller, J.P. (New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center). Aug 1986. Contract AC21-81MC16426. 138p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86000293.

This report gives an overall description of a Mobility Control Test of CO_2-Foam, performed in Pennzoil's Rock Creek Field of Roane County, West Virginia. The test did not produce any oil and was unfortunately not as definitive as had been wished. In particular, it did not give an unequivocal answer to the major question that had been asked - "What is the effectiveness of such a simulataneous injection of dense CO_2 and surfactant solution in suppressing viscous instability of the displacement front in order to improve the performance and efficiency of CO_2 floods." Despite this relative silence with respect to the most important question, the test did yield some results which can be of use to the industry. The first of these is that it is possible to inject dense CO_2 and surfactant solution simultaneously into a regular injection well. The reduced injectivity can be interpreted as due to reduced mobility of CO_2-foam, as an injection fluid with an apparent viscosity about 2 1/2 times that of water. The second test result of some interest is that the simultaneous injection of surfactant with the CO_2 was apparently successful in retarding the formation of viscous fingers and early breakthrough of CO_2 into a producing observation well only 75 feet away. The report gives details on related research and operating projects, on the design of all features of this test, on the chronology of injection and sampling, and on the test results. In addition, three extensive appendices give descriptions of related computer calculations of expected flooding patterns, of results to be expected from the Point Dilution Method and in the distribution of tracer concentration in the formation after a period of radial flow from the injection well. 25 refs.

47217 **(DOE/SF/11564—17) Thermal injection well falloff testing, SUPRI TR-33.** Walsh, J.W. Jr. (Stanford Univ., CA (USA). Petroleum Research Inst.). Aug 1986. Contract AC03-81SF11564. 66p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86000286.

This study was conducted to find field case histories from which the swept volume could be determined from pressure transient tests at thermal injection well. Knowledge of the swept volume permits calculation of important economic parameters including the fuel concentration in a combustion test and heat loss in a steamflood. In an earlier study, a pressure transient model of a two-region reservoir was solved analytically and results demonstrated that in principle, both the permeability-thickness and the swept volume may be determined from a pressure transient test. A typical falloff curve consisted of an initial semilog straight line, a transitional period, and finally, a second semilog straight line. The transition period was found to contain a pseudosteady-state Cartesian straight line whose slope was related to the swept volume. Several sets of field test data were examined to verify the existence of the Cartesian straight line. In order that the swept volume may be calculated from the slope of the Cartesian straight line, the average reservoir pressure and temperature in the swept zone must be estimated. The average pressure is the early-time flattening of the pressure curve on a semilog graph. The average temperature in a steamflood can be estimated from the average pressure, but average temperature must be calculated for combustion. One method of calculation involves a heat balance which includes both the heat generated by combustion and the heat loss to the overburden. Several case histories are presented from both in-situ combustion and steamflood projects. An investigation for each case history shows the information that may be obtained from pressure transient tests. Pressure transient testing of the injection well is useful in evaluating and controlling the performance of thermal recovery projects.

47218 **(NIPER—170) Literature review on agents to inhibit mineral dissolution. Project BE4B, Milestone 2, Task 5D.** Thornton, S.D. (National Inst. for Petroleum and Energy Research, Bartlesville, OK (USA)). 1985. Contract FC22-83FE60149. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014863.

A literature search was conducted on compounds capable of preventing dissolution of sandstone and scale formation during petroleum recovery processes. Most compounds considered for control of rock/water reactions are intended for well treatment but not for injection into an entire formation. Compounds that have been found to control water/rock reactions are discussed. These compounds, organic and inorganic, operate by adsorbing onto minerals to reduce their reactivity or by sequestering calcium and magnesium ions in solution. There are more compounds suited for scale prevention and treatment in oil wells at neutral pH than for reducing dissolution of reservoir rock under alkaline conditions. 23 refs.

47219 **Potential of thermal recovery in the United States.** Stosur, G.J.; Frye, K.N. Regina, Saskatchewan; The Petroleum Society of CIM (1985). 1-4p. (CONF-8509282—).

From 1. technical conference of the South Saskatchewan Section of the Petroleum Society of CIM; Regina, Saskatchewan, Canada (15 Sep 1985).

Even though thermal oil recovery methods already contribute about 80% of oil production from all known EOR methods, oil production by thermal recovery is expected to continue to increase for at least 10 years and to provide the highest contribution to oil recovery of all other EOR methods for at least 20 years into the future. Under a somewhat more optimistic scenario, oil production from thermal recovery would grow for about 20 years and would continue to produce more oil than any other EOR method for more than 30 years into the future. Thermal oil recovery potential in terms of the production rates and ultimate recovery for various technical and economic scenarios are presented in graphical form for the next 30 years.

0204 Processing

47220 **(IFP—33-730) Behavior during steam cracking of model molecules and of hydrotreated vacuum distillates.** Chaverot, P. (Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison). Oct 1985. 355p. (In French). NTIS (US Sales Only), PC A16/MF A01. File Number DE86753179.

After a review of hydrocarbon pyrolysis with steam, a correlation between industrial results and those obtained in a small pilot is attempted. Molecules responsible for a decrease in light olefins yield and an increase of fuel production are determined in vacuum distillates before and after hydrotreatment. Reaction mechanisms by cracking of model molecules contained in heavy fractions are examined. By hydrotreatment the ratio H/C is increased, the structure of the aromatic fraction of vacuum distillate is simplified, size of aromatics is decreased and sulfur content of molecules is very low. 115 refs.

0205 Products And By-products

REFER ALSO TO CITATION(S) 47235

47221 **(AD-A—167448/0/XAB) Chemistry of deposit formation in distillate fuels.** Hazlett, R.N.; Power, A.J.; Kelso, A.G.; Solly, R.K. (Materials Research Labs., Ascot Vale (Australia)). Jan 1986. 66p. (MRL-R—986). NTIS, PC A04/MF A01.

The chemistry of deposit formation in distillate fuels was investigated at 65 and 80 C for time peroids equivalent to up to four years ambient storage. The chemical environment was varied by using different fuels, fuel blends, deposit promoters, and stabilzers. Blends of light cycle oil (LCO) in straight-run automotive distillate oil (ADO) were studied in most detail. A variety of carboxylic acids, a sulfonic acid, thiophenol, and caustic extract from LCO (primarily phenols) increased deposit formation, some very dramatically. For the carboxylic acids, a linear relationship was found between the hydrogen ion concentration calculated from pK/sub a/ values for water solutions and the amount of deposit formed. These acids enhanced deposit formation by catalytic action and are not incorporated into the deposit. Dodecylbenzenesulfonic acid and thiophenol were both strong deposit promoters, the latter deriving its major activity through partial conversion to benzenesulfonic acid during fuel stress. The phenols in the LCO caustic extract react via oxidative coupling to increase molecular size and develop low solubility in the fuel. A tertiary aliphatic amine stabilzer was effective for reducing the amounts of deposits from most stressed fuels and from all blends tested.

0206 Health And Safety

REFER ALSO TO CITATION(S) 48909

0207 Marketing And Economics

REFER ALSO TO CITATION(S) 47219, 47225

0209 Environmental Aspects

47222 **(PB—86-209145/XAB) Outer Continental Shelf environmental assessment program. Final reports of principal investigators. Volume 38.** (National Ocean Service, Anchorage, AK (USA). Ocean Assessments Div.). Apr 1986. 740p. NTIS, PC A99/MF A01.

This final report of a study of the environmental characterization of the North Aleutian Shelf nearshore region includes: characterization, processes, and vulnerability to development; and annotated bibliography and keyword index.

0230 Properties

REFER ALSO TO CITATION(S) 48061

47223 **(NIPER—178) Effect of weathering on octane quality for winter-grade gasolines.** Wares, R.N. (National Inst. for Petroleum and Energy Research, Bartlesville, OK (USA)). 31 Jul 1986. Contract FC22-83FE60149. 32p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014656.

The experimental program at NIPER was initiated to provide information to make technical judgments on fuel, fuel specifications, and fuel conditioning requirements for a range of fuels that could be utilized in current light aircraft. This portion of the work is centered on determining the acceptability of motor fuels that have been weathered, causing loss of volatile components. Commercial auto gasolines from various locations are being surveyed in terms of volatility and octane quality - in both as received and after weathering conditions. Antiknock quality is being evaluated to assess the suitability of this variety of auto fuels for aviation applications. To date, experiments have been conducted with ten winter (January-February) fuels that were obtained from commercial suppliers representing various geographic (refining) areas in the contiguous 48 states. The fuels were tested in as received condition with no modifications to the existing vapor pressures. Similar fuel properties (octane ratings, distillation character, fuel composition) are also presented in the section dealing with test results. 15 figs., 12 tabs.

47224 **Use of laser light to measure surface tension.** Longrigg, P. (Solar Energy Research Institute, Golden, CO). pp vp of Proceedings of the international congress on applications of lasers and electro-optics. Toledo, OH; Laser Institute of America (1985). (CONF-8511103—).

From ICALEO international congress on the applications of lasers and electro-optics; San Francisco, CA, USA (11 Nov 1985).

This paper describes a technique that utilizes an effective synthesis by a liquid meniscus of a right-angle prism, leading to what might loosely be termed an optical 'lever effect' or total internal reflection (TIR), upon a narrow beam of laser light from a He-Ne laser traversing a beaker of ordinary lubricating oil. This angular deflection can thereby be employed to determine contact angle and therefore the surface tension of a liquid. Meniscus geometry is an important parameter in crystal growth procedures. A non-intrusive or no contact probe detailing meniscus shape and geometry would be of considerable value in identifying the types of menisci associated with various crystal growth techniques. The measurment of interfacial tension at fluid interfaces together with the measurement of contact angle which is formed between the fluid interface and a restraining wall, is of primary importance in surface science metrology. Numerous techniques have been developed to make

such measurements and the methods most often used include the de Nouy ring, Wilhelmy plate, and drop weight.

0240 Storage

47225 **(GAO/RCED—85-115) Analysis of oil withdrawal and distribution tests for the Strategic Petroleum Reserve.** (General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.). 8 May 1985. 30p. US General Accounting Office, Box 6015, Gaithersburg, MD 20877. File Number TI85901760.

Report to the Chairman, Subcommittee on Environment, Energy, and Natural Resources, Committee on Government Operations, House of representatives.

Periodic tests of the oil withdrawal and distribution capabilities of the Strategic Petroleum Reserve (SPR) would help deomonstrate that the system will work in a crisis. GAO assessed the feasibility, cost, effectiveness, and oil market impact of several suggested SPR test scenarios involving either oil sales or storage and examined factors that should be considered in designing a cost-effective test. GAO noted that the suggested tests are generally feasible. However, to provide the most confidence in total SPR system realiability, a test should involve a drawdown and distribution at maximum sustainable capacities. Test costs could be minimized by storing a maximum of withdrawn oil at SPR terminal sites and by simulating oil sales. GAO also noted that a combined sales/storage test could be: (1) designed to stress the SPR system by maximizing both oil withdrawal and distribution and (2) sustained as long as desired but would likely cost more than either a sales or storage test. 1 fig., 4 tabs.

47226 **(PB—86-203833/XAB) Guidance document on evaluation of injection-well manifold monitoring systems.** (Woodward-Clyde Consultants, Englewood, CO (USA)). Nov 1985. 54p. NTIS, PC A04/MF A01.

In the Underground Injection Control (UIC) Regulations, owners and operators of Class II hydrocarbon storage and enhanced recovery wells are allowed to monitor injection pressure, flow rate, cumulative volume, and the nature of the injected fluids on a field/project basis rather than on an individual-well basis through the use of manifold monitoring (40 CFR Section 146.23(b)(5)). Such a monitoring system may be used in cases of operation consisting of multiple injection facilities operating with a common manifold. Separate monitoring systems for each well would not be required provided that the owner/operator demonstrates to EPA's satisfaction that manifold monitoring is comparable to individual well monitoring. The purpose of the document is to develop technical guidance and ancillary criteria to enable EPA personnel to evaluate the effectiveness of such system proposals in meeting the regulatory requirements.

47227 **(R-MECH—02/83) Results of numerical modelling of non-isothermal flows - flows produced by density gradients.** Baerwolff, G.; Bungartz, H. (Akademie der Wissenschaften der DDR, Berlin. Inst. fuer Mechanik). 1983. 74p. (In German). Akademie der Wissenschaften der DDR, Berlin. Inst. fuer Mechanik.

In caverns under the earth-surface (for example storing of fossil fuel) and in furnaces of melting glass we can see convective fluid motion because of existing temperature- resp. density-gradients. This fact is described by the mathematical model of 'Boussinesq-approximation'. The obtained coupled nonlinear system of p.d.e. is solved by a finite difference method (two dimensional case) and by a GALERKIN-method (three dimensional case).

0250 Combustion

47228 **(DGRST—81-D-0512) Formation of cenospheres by pyrolysis and oxydative pyrolysis of a monodispersed string of droplets of heavy fuel.** Lahaye, J.; Bomo, N.; Ladurelli, A.; Claus, M.; Escalier, J.C. (Delegation Generale a la Recherche Scientifique et Technique (DGRST), 75 - Paris (France)). Aug 1983. 100p. (In French). (DGRST—81-D-0513). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752844.

A great amount of solid unburnts is produced by heavy fuel combustion. These solid unburnts are essentially soot and cenospheres which are spherical particles, generally hollow, between 100 microns and few hundred microns. Solid emission is very variable for different heavy fuels. The aim of this work is to limit cenosphere production during heavy fuel combustion. The main parameters are: fuel composition, droplet size, initial temperature of fuels, temperature, time of reaction, droplet gaseous environment. Cenosphere formation depends more on asphalten chemical structure than on asphalten content. Cenospheres are produced at much lower temperature than soot. Cenosphere is produced inside the droplet and not at the liquid/gas interface during hydrocarbon carbonisation. The thermal transfer model realized agrees with results obtained. 56 refs.

03 NATURAL GAS

0302 Geology And Exploration

47229 **(PB—86-215746/XAB) Exploration-production studies in newly drilled Devonian-Shale gas wells. Annual report, February 1, 1985-January 31, 1986.** Graham, R.L. (Graham (Reuben L.), Inc., Charleston, WV (USA)). Feb 1986. 63p. NTIS, PC A04/MF A01.

The Devonian shale has been recognized as an important source of gas in the Appalachian Basin. The program aids producers in the collection of reservoir data not normally collected and assists in the evaluation of the effectiveness of zone selection and stimulation designs and methods. The study should provide a fuller understanding of the relationships that affect productivity in the Devonian shale. The relationships between gas flows and geological features that control the production characteristics in the Devonian shale are being developed.

0303 Drilling, Production, And Processing

47230 **Membrane separation technology.** Stookey, D.J.; Patton, C.J.; Malcolm, G.L. New York, NY; American Institute of Chemical Engineers (1986). 8p. (CONF-860447—).

From American Institute of Chemical Engineers spring national meeting; New Orleans, LA, USA (6 Apr 1986).

Membrane separations of interest here are not to be confused with barrier separations of the type employed in the uranium enrichment plant at Oak Ridge, Tennessee. There isotopes of uranium hexafluoride were separated by the free-molecular or Knudsen flow of the gas mixture through the pores and orifices created within a porous nickel media which was sometimes referred to as a membrane. In barrier separation, an enrichment of gases of differing molecular weights is accomplished by the differing gaseous diffusion rates within the porous media. By contrast the membranes of interest here are thin, dense, continuous films, typically formed from polymers. The separation of species is accomplished by the dissolution of the gases in the polymer and their diffusion across the solid film thickness under a concentration gradient according to Fick's law. This process is commonly referred to as membrane permeation.

0304 Products And By-products

REFER ALSO TO CITATION(S) 47220

0305 Health And Safety

47231 **(PB—86-207685/XAB) VENT II: a microcomputer program for designing vent systems for high-efficiency gas appliances. Software.** Ufkes, L.S. (Battelle Columbus Div., OH (USA)). Dec 1985. vp. NTIS, PC A99/MF A01.

The VENT-II microcomputer model was developed for use by natural gas applicance manufacturers to properly design the venting systems for either natural-draft or power-vent systems. The program calculates the static pressures at various user-specified locations in the vent system for a given set of appliance operating

conditions. The microcomputer model also calculates the gas temperatures and compositions at various user specified locations in the vent system. A manufacturer also can use the information to determine if condensation will occur in the vent. The VENT-II program is interactive and user-friendly, and therefore should be a useful tool to assist manufacturers in the proper design of vent systems for many types of high-efficiency gas-fired appliances -- including furnaces, boilers, and water heaters.

0306 Marketing And Economics

47232 **(PB—86-203114/XAB) Competitive position of natural gas: steel-reheat applications, Topical report, January 1985-May 1986.** Williams, J.H.; Koch, G.S.; McDermott, H.; Klareich, F.H. (Hagler, Bailly and Co., Washington, DC (USA)). May 1986. 159p. NTIS, PC A08/MF A01.

Steel-reheat market application profiles are developed for natural gas and other fossil-fueled furnaces as well as for electric-induction furnaces. Natural gas accounts for over 72% or, 135 of the 187 trillion Btu per year currently used for reheating steel prior to rolling or other forming operations. Future steel industry and technology trends are examined for potential impact on natural gas use and natural gas technologies. Beyond the global factors affecting the steel industry as a whole, further implementation of hot charging and direct rolling techniques could reduce the amount of fuel needed for reheat. New steel forming processes now under development seek to minimize the time and energy needed for reheat, and could place dramatically new requirements on gas-fueled reheat technologies. Although more costly, current electric induction heating technologies appear to be better positioned to take advantage of these new processes. New R&D opportunities for the natural gas industry are discussed in the context.

0309 Artificial Stimulation

REFER ALSO TO CITATION(S) 47226, 47441

47233 **(PB—86-213972/XAB) Multiple-fracture stimulation using controlled pulse pressurization. Final report, March 1983-December 1985.** Schrauf, T.; Sinha, K.; Van Buskirk, R.; Hanson, J. (Terra Tek, Inc., Salt Lake City, UT (USA)). Dec 1985. 88p. (TR—86-52). NTIS, PC A05/MF A01.

It has previously been established that multiple hydraulic fractures can be created from a single borehole by high-rate, high-pressure, pulsed-fracture treatment. It was the objective of the project to quantitatively understand the process by a combined experimental-theoretical program. A fracture initiation model was developed based on a coupled pore pressure-stress formalism and classical mode I flaw opening concepts. The dependence of fracture initiation on pressurization rate, peak pressure, and the physical parameters of the formation and frac fluid, which is contained within the formalism, is evaluated. A simple fracture propagation model has been used in conjunction with the fracture initiation model to aid in defining multiple fracture-experiment design parameters, and indicates that borehole storage effects can play a major role in initial fracture extension.

47234 **(PB—86-213998/XAB) Preliminary economic assessment potential for producing coalbed methane for the multiple coal seams completion project at Rock Creek. Topical report, March 1983-May 1986.** Schwerer, F.C.; Militzer, M.R.; Boyer, C.M. (United States Steel Corp., Monroeville, PA. Technical Center). May 1986. 116p. (REPT—76-H-088/089). NTIS, PC A06/MF A01.

The Multi-Seam project, located at the Rock Creek site in the eastern part of the Warrior Basin, Alabama, was initiated to develop, evaluate, improve, and communicate the technology required to produce methane from vertical wells completed into multiple coalbeds. The study evaluates the economic potential for commercial production of methane from multiple coal groups as encountered at the Rock Creek site based on data acquired from the project and state-of-the-art reservoir models.

47235 **(PB—86-217098/XAB) Geologic and reservoir characteristics of the Red Mountain coalbed-methane test site in the Piceance Basin. Topical report, April 15, 1983-January 31, 1986.** Seccombe, J.C.; Decker, A.D. (Resource Enterprises, Inc., Grand Junction, CO (USA)). May 1986. 102p. NTIS, PC A06/MF A01.

The Red Mountain Site, leased and operated by Resource Enterprises, Inc. is the focus of a six-year, multi-well project with a main objective to develop, improve, evaluate, and communicate the technology required to produce gas from deeply buried coal. To understand the parameters controlling coalbed gas production, project efforts are focused on a single coal reservoir (the Cameo Coal D Seam) at the test site. The report focuses on the evaluation of reservoir parameters controlling coalbed gas production and the geologic conditions influencing these parameters at the Red Mountain Site. The most critical parameters at the site are permeability, saturation of the cleat system, gas content, capillary pressure, and mechanical properties of the coal. Less critical, but also reviewed are adsorption isotherms, diffusion time, desorption critical pressure, and porosity.

0320 Transport, Pipelines, And Handling

47236 **(PB—86-203254/XAB) Reference standard polyethylene resins and piping materials. Annual report, October 1, 1984-September 30, 1985.** Crissman, J.M.; Wang, F.W.; Guttman, C.M.; Maurey, J.R.; Wagner, H.L. (National Bureau of Standards, Washington, DC (USA). Polymers Div.). Nov 1985. 19p. NTIS, PC A02/MF A01.

Polyethylene piping is currently in widespread use in gas distribution in the United States, and represents approximately 80% of new installation. Research that is currently being performed on gas pipes often employs many different polyethylenes selected from the large number of polyethylenes available for the use. The variation in materials makes it difficult to compare results from different research laboratories, or to compare measurements carried out in the same laboratory at different times. To avoid the difficulty, Gas Research Institute and the National Bureau of Standards (NBS) have undertaken to provide a permanent store of one particular polyethylene resin as well as piping and fittings made from it which would provide a source of well characterized materials for research related to gas-distribution systems. The report describes the choice of the resin and the types and quantities of the materials to be provided by NBS. Also described are some preliminary results on the characterization of the resin.

0330 Properties

47237 **(N—86-24962) Measurement of viscosity of gaseous mixtures at atmospheric pressure.** Singh, J.J.; Mall, G.H.; Chegini, H. (National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center). May 1986. 19p. (NASA-TP—2582; L—16103). NTIS, PC A02/MF A01.

Coefficients of viscosity of various types of gas mixtures, including simulated natural-gas samples, have been measured at atmospheric pressure and room temperature using a modified capillary tube method. Pressure drops across the straight capillary tube section of a thermal mass flowmeter were measured for small, well-defined, volume flow rates for the test gases and for standard air. In this configuration, the flowmeter provides the volumetric flow rates as well as a well-characterized capillary section for differential pressure measurements across it. The coefficients of viscosity of the test gases were calculated using the reported value of 185.6 micro P for the viscosity of air. The coefficients of viscosity for the test mixtures were also calculated using Wilke's approximation of the Chapman-Enskog (C-E) theory. The experimental and calculated values for binary mixtures are in agreement within the reported accuracy of Wilke's approximation of the C-E theory. However, the agreement for multicomponent mixtures is less satisfactory, possible because of the limitations of Wilkes's approximation of the classical dilute-gas state model.

0340 Combustion

REFER ALSO TO CITATION(S) 48663

47238 (PB—86-203239/XAB) Advanced heat-pipe heat exchanger and microprocessor-based modulating burner controls development. Annual report, January 1985-January 1986. Lowenstein, A.; Cohen, B.; Feldman, S.; Spatz, M.; Smith, E. (Thermo Electron Corp., Waltham, MA (USA)). Mar 1986. 115p. NTIS, PC A06/MF A01.

The development of a novel condensing heat exchanger, a modulating gas burner, and a zone-controlled residential warm-air heating system is described. The condensing heat exchanger uses ten thermosyphons manifolded at both the condenser and evaporator ends to achieve a compact low-cost design. Initial tests have demonstrated a +92-% steady-state efficiency for a conventional clamshell furnace operating with the thermosyphon heat exchanger located outside the furnace cabinet. A 1000,000-Btu/hr modulating burner was also developed. A comprehensive study of the burner's operating characteristics produced guidelines for the design and application of the device. Finally, the modulating burner incorporated into a zone-controlled heating system. In parallel with the development of the preceding heating system components, the performance of thermosyphons over a wide range of operating conditions is being explored with the objective of improving design procedures for incorporating these devices into heat exchangers.

47239 (PB—86-214012/XAB) Elementary processes in the catalytic combustion of methane (mechanism, intermediates, and controlling reactions). Final report, October 1981-December 1985. Wise, H.; Quinlan, M. (SRI International, Menlo Park, CA (USA)). May 1986. 106p. NTIS, PC A06/MF A01.

Three transition metals (Ni, Ir, and Pt) were studied as catalysts for the oxidation of methane. These metals were chosen because of their different reactivities toward oxygen and hydrocarbons. The evaluation of their catalytic properties for methane oxidation was based on specific catalyst activity for complete oxidation, susceptibility to poisoning by sulfur compounds during catalytic reaction, quantitative reaction kinetics, formation of partially oxidized products, and effect of gaseous additives on methane oxidation. The experimental results demonstrated the superior performance of the noble-metal (NM) catalysts (Pt and Ir) over the base-metal (BM) catalyst (Ni). The NM catalysts combine high specific activity for oxidation of both methane and sulfur compounds, making them the most-suitable candidates for natural gas combustion without loss in activity caused by sulfur compounds used as odorants in the feed stream.

47240 (PB—86-215662/XAB) Integrated natural-gas-engine cooling-jacket vapor-compressor program. Annual report (Phase 1A), February 1985-October 1985. DiBella, F.A.; Balsavich, J.; Becker, F. (Thermo Electron Corp., Waltham, MA (USA)). Dec 1985. 165p. NTIS, PC A08/MF A01.

The project objective is to design and test a prototype Integrated Gas Engine Vapor Compression System; a system that is thought to be an attractive and economically viable alternative to currently available cogeneration systems. A unique, alternative cogeneration system has been designed that will provide an industrial or commercial energy user with high-pressure steam and electricity directly from a packaged cogeneration system. The Integrated Gas Engine Vapor Compression System concept includes an engine-generator set and a steam screw compressor that is mechanically integrated with the engine.

0350 Storage

REFER ALSO TO CITATION(S) 47226

04 OIL SHALES AND TAR SANDS

0401 Reserves And Exploration

REFER ALSO TO CITATION(S) 47229

47241 (DOE/LC/10916—1984) Reconnaissance examination of selected oil sand and oil spring occurrences in Wyoming. Final report. Ver Ploeg, A.J. (Wyoming Geological Survey, Laramie (USA)). Jun 1986. Contract AS20-82LC10916. 54p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86001096.

Numerous oil seeps and oil sands have been reported in the literature in Wyoming. Clark and Glass (Clark, M., and Glass, G.B., 1982, Review of reported tar sand occurrences and recent projects in Wyoming: Geological Survey of Wyoming Open File Report 82-5, 49 p.) reviewed the literature for reports of occurrences and catalogued 78 reported occurrences of shallow or outcropping oil sands and oil seeps in Wyoming. The majority of these references are quite old, with vague descriptions of locations and formations containing the oil. The purpose of this study was to do a reconnaissance field examination of selected occurrences to better describe the occurrence and make some assessment as to the potential economic importance of the deposit. A reconnaissance geologic map of the occurrence was constructed from field observations and existing maps from the literature. The deposit was sampled, described and photographed. Since it was impossible to visit 78 reported occurrences, the author visited only those surface occurrences which appeared significant based on the descriptions in the literature. A total of ten occurrences were visited and described during the summers of 1984 and 1985. The author attempted to locate additional reported occurrences, but either the description in the literature was too vague to locate the deposit or evidence of the occurrence could no longer be located due to developmental activity in the area. Also, a few of the occurrences which were located were deemed to be insignificant and were not described in detail or sampled. The oil sand occurrences examined were all in sandstones of varying depositional environments and ranged in age from Tertiary to Pennsylvanian. Examples of both structural and stratigraphic traps were examined. Both oil seeps examined appeared to be related to nearby faults. Some of the occurrences contain live oil at the outcrop while others appeared to contain primarily dead oil. 39 refs., 32 figs.

47242 (PB—86-215720/XAB) Devonian-shale well-log interpretation. Annual report, 1985. Truman, R.B.; Campbell, R.L. (ResTech Houston, Inc., TX (USA)). Feb 1986. 111p. NTIS, PC A06/MF A01.

Prototype geophysical well-log interpretation models were developed to determine the lithology, porosity, and bulk-volume free hydrocarbon in the Devonian shale. These models are based on quantitative thin section point count and x-ray-diffraction measurements made on mechanical sidewall core samples taken in the same Devonian-shale wells in which the geophysical well logs were recorded. The porosity determined using these lithology and porosity models compares favorably with the porosity measured on the core samples in the laboratory. Integration of the results from the quantitative geophysical well-log interpretation with the qualitative interpretation of the mud logs, temperature surveys, noise logs and borehole television has led to the development of a qualitative producibility model.

0403 Drilling, Fracturing, And Mining

47243 (SAND—86-1858C) Status of fragmentation modeling development. Gorham-Bergeron, E.D.; Kuszmaul, J.S. (Sandia National Labs., Albuquerque, NM (USA). In Situ Technologies Div.). 1986. Contract AC04-76DP00789. 12p. (CONF-860847—4). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014721.

From 2. annual oil shale contractors' meeting; Morgantown, WV, USA (12 Aug 1986).

The objective of the fragmentation modeling program is to develop the ability to predict rubble characteristics (fragment sizes and void distribution) that will be induced by a given blasting design. This predictive ability will aid in the development of blasting designs for in-situ retorting of oil shale. Specific objectives in the last year have been (1); to improve the numerical models that are used to predict rock fracturing and rubble motion and (2) to compare model predictions to results from fragmentation experiments to aid in verification of the models. The first two accomplishments involve computational improvements. This year, a new finite-element code was used for fracture modeling. This code, PRONTO, replaces the one previously used, DYNA2D. There are two key advantages to using PRONTO: PRONTO is much faster than DYNA2D, and PRONTO is well-structured and well-documented, making it easier to make changes in the code. Another improvement was made within the motion modeling. The circular elements that are used in CAROM have restricted the type of motion that could be simulated. This year, new behavior mechanisms were introduced: the elements were allowed to roll, friction between elements was added, and, most importantly, the elements were given the ability to apply torque to one another about their point of contact. The inclusion of torque allows the elements to interact in a way that is characteristic of noncircular or nonspherical elements. This extension of the code allows for the simulation of motion of nonspherical particles providing more physically realistic calculations for rock. 10 refs., 10 figs.

0404 Oil Production, Recovery, And Refining

REFER ALSO TO CITATION(S) 47243

47244 (DOE/LC/10036—2009-Vol.1) Occidental vertical modified in situ process for the recovery of oil from oil shale, Phase 2. Construction, operation, testing, and environmental impact. Final report, August 1981-December 1982. Volume 1. Stevens, A.L.; Zahradnik, R.L.; Kaleel, R.J. (Occidental Oil Shale, Inc., Grand Junction, CO (USA); TRC Environmental Consultants, Inc., Englewood, CO (USA)). Jan 1984. Contract FC20-79LC10036. 516p. NTIS, PC A22/MF A01; 1; GPO Dep. File Number DE86006610.

Occidental Oil Shale, Inc. (OOSI) recently completed the demonstration of mining, rubblization, ignition, and simulataneous processing of two commericalized modified in situ (MIS) retorts at the Logas Wash facility near DeBeque, Colorado. Upon completion of Retort 6 in 1978, Occidential began incorporating all of the knowledge previously acquired in an effort to design two more commercial-sized MIS retorts. Any commercial venture of the future would require the ability to operate simultaneously more than one retort. Thus, Retorts 7 and 8 were developed during 1980 and 1981 through joint funding of the DOE and OOSI in Phase II. Rubblization of the retorts produced an average rubble void of 18.5% in the low grade shale (17 gallons per ton) at the Logan Wash site. After rubblization, bulkheads were constructed, inlet and offgas pipes were installed and connected to surface processing facilities and liquid product handling systems were connected to the retorts. Extensive instrumentation was installed in cooperation with Sandia National Laboratories for monitoring the complete operation of the retorts. After pre-ignition testing, Retort 8 was ignited in December of 1981 and Retort 7 was ignited in January of 1982. The retorts were operated without interruption from ignition until mid- November of 1982 at which time inlet gas injection was terminated and water quenching was begun. Total product yield from the two retorts was approximately 200,000 barrels of oil, or 70% of the Fischer Assay oil-in-place in the rubblized rock in the two retrots. Water quenching studies were conducted over a period of several months, with the objective of determining the rate of heat extraction from the retorts as well as determining the quantity and quality of offgas and water coming out from the quenching process. Data from these studies are also included in this Summary Report. 62 figs., 18 tabs.

47245 (DOE/LC/10036—2009-Vol.2) Occidental vertical modified in situ process for the recovery of oil from oil shale, Phase 2. Tracer test results. Final report, August 1981-December 1982. Volume 2. Wojdac, L.; Peterson, J. (Occidental Oil Shale, Inc., Grand Junction, CO (USA)). Jan 1984. Contract FC20-79LC10036. 508p. NTIS, PC A22/MF A01; 1; GPO Dep. File Number DE86006611.

The main objectives of the tracer test program were to: (1) Determine the overall gas flow distribution. (2) Define any areas of channeling. (3) Determine the active void. (4) Determine the gas flow distribution in Intermediate Levels of the Retort. During the retort 6 tracer tests and those performed on Mini-Retorts 3 and 4, it was found that when tracer was injected into the plenum, only very disperse tracer curves were detected. The dispersion was the result of extensive mixing in the plenum. As a result, tracer was injected below the rubble surface in all of the tracer tests for Retorts 7 and 8. Sulfur hexafluoride SF was used as a tracer in all tests. The air flow rate was maintained approximately constant at 16,000 SCFM during all tests. Each retort was tracer tested in three test sequences: (1) Upper Level to Intermediate Level; (2) Intermediate Level to Lower Level; (3) Upper Level to Lower Level. In each sequence, tracer was injected into a single gas sampling tap while an array of taps were sampled at a lower level. The array was selected to obtain space time velocities and to measure the lateral flow through the retort. Wall taps were used to determine the degree of channeling that could be expected along the walls of the retorts.

47246 (DOE/LC/10036—2009-Vol.3) Occidental vertical modified in situ process for the recovery of oil from oil shale, Phase 2. Air quality and meteorological data. Final report, August 1981-December 1982. Volume 3. Stevens, A.L.; Zahradnik, R.L. (Occidental Oil Shale, Inc., Grand Junction, CO (USA)). Jan 1984. Contract FC20-79LC10036. 469p. NTIS, PC A20/MF A01; 1; GPO Dep. File Number DE86006612.

Volume III contains monthly air monitoring reports for Logan Wash Oil Shale site from January 1982 through December 1982.

0405 Properties And Composition

REFER ALSO TO CITATION(S) 47247

0409 Waste Research And Management

47247 (DOE/FE/60177—2152) Extraction of inorganic chemical constituents from retorted oil shale by complexometric agents. Essington, M.E.; Carroll, R.B. (Western Research Inst., Laramie, WY (USA)). Sep 1985. Contract FC21-83FE60177. 54p. (WRI—86-021M). NTIS, PC A04/MF A01; GPO Dep. File Number DE86014286.

Synthetic leachate solutions containing complexometric agents were used to simulate the long-term release of trace metals, carbonates, and sulfates from indirectly retorted (IH) and directly retorted (DH) oil shale. This approach was also taken to accelerate the leaching process in a lab scale/real time leach test which would approach the maximum potential release of chemical constituents. The complexometric agents examined were acetate, oxalate, and citrate ions, and EDTA and DTPA. Retorted oil shales were also extracted with distilled-deionized water. Leachate samples were analyzed for silver, arsenic, boron, barium, cadmium, chromium, copper, iron, mercury, molybdenum, nickel, lead, antimony, selenium, vanadium, zinc, fluorine, carbonate, and sulfate. For the indirectly retorted oil shale, maximum metallic element leachability was observed with EDTA and DTPA. In general, as the length of extraction period increased so did metal extractability. The DH sample, composed mineralogically of a number of high-temperature

alteration products, produced higher leachate pH and electrical conductivity values. This was attributed to the instability of high-temperature mineral phases at low temperatures and pressures. Oxalate, in addition to EDTA and DTPA, was found to affect a high trace metal solubility. The extractability of trace metallic elements from DH, however, was lower than that for IH, thus illustrating the insolubility of metallic element-bearing minerals at high pH and the ability of ionic species released from DH to form sparingly soluble solids with trace metallic elements. 29 refs., 12 figs., 16 tabs.

0410 Environmental Aspects

REFER ALSO TO CITATION(S) 47244, 47246

05 NUCLEAR FUELS

REFER ALSO TO CITATION(S) 48094

0501 Reserves

47248 (IAEA-TECDOC—361) **Vein type uranium deposits. Report of the Working Group on Uranium Geology.** (International Atomic Energy Agency, Vienna (Austria)). Jan 1986. 423p. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

Veins are tabular- or sheet-like masses of minerals occupying or following a fracture or a set of fractures in the enclosing rock. They have been formed later than the country rock and fractures, either by filling of the open spaces or by partial or complete replacement of the adjoining rock or most commonly by both of these processes combined. This volume begins with the occurrences and deposits known from old shield areas and the sedimentary belts surrounding them. They are followed by papers describing the European deposits mostly of Variscan age, and by similar deposits known from China being of Jurassic age. The volume is completed by two papers which do not fit exactly in the given scheme. A separate abstract was prepared for each of the 25 papers in this report.

47249 (IAEA-TECDOC—361, pp 9-20) **Problem of uranium mineralization in precambrian metamorphic shear tectonites - with particular reference to the Singhbhum copper-uranium belt, Eastern India.** Sarkar, S.C. (Department of Geological Sciences, Jadavpur Univ., Calcutta, India). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Uranium mineralization has taken place discontinuously along the 200 km long Singhbhum Copper-Uranium Belt, Eastern India, concentration being more in the central part. The early Proterozoic rocks containing the mineralization are characterized by L-S type structures and zones of mylonitization. The principal orebody at Jaduguda extends for more than 1 km along the dip (40 deg. to 60 deg.). There is evidence on all scales that deformation has outlasted ore mineralization. The zones of intense copper and uranium mineralization do not coincide, although some uranium is recoverable from the tailings of the copper ores from most of the deposits mined. The average grade of the uranium ore from the Singhbhum Belt is $<0.01\%$ U_3O_8. The principal ore mineral, uraninite, occurs as disseminated grains and crystals. Other uranium-bearing minerals are sooty pitchblende, a complex U-Ti oxide, allanite, xenotime, davidite, pyrochlore-microlite, clarkeite, autunite, torbernite, schoepite and uranophane. Ni(-Co)-Mo-S(-As-Se)-mineralization occurs close to that of uranium in the Jaduguda-Bhatin sector. The dominance of uraninite over pitchblende, the presence of several percents of REE in uraninte, the development of hematite-bearing quartz and sodic oligoclase at places, the local association of uranium mineralization and Ni(-Co)-Mo-S(-As-Se)-mineralization and the continuation of some of the ore veins to considerable depth suggest these ores formed at moderately high temperatures. The age of mineralization is 1500 to 1600 Ma. 19 refs., 6 figs., 1 tab.

47250 (IAEA-TECDOC—361, pp 21-42) **Uranium genesis within the Arjeplog-Arvidsjaur-Sorsele uranium province, Northern Sweden.** Haalenius, U.; Smellie, J.A.T.; Wilson, M.R. (Sveriges Geologiska Undersoekning, Luleaa). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The Arjeplog-Arvidsjaur-Sorsele uranium province in Northern Sweden represents a new crustal addition along the southern margin of the Svecokarelian Archaean 'Karelian Continent' with extensive granitoid formation at 1900-1850 Ma from igneous sources with a very short crustal history. Emplacement of the magmas has been strongly controlled by deep marginal faults. The more acid varieties of the igneous rocks can be uranium-enriched. Granite intrusion can be considered coeval with regional metamorphism and has probably provided the driving mechanism to cause hydrothermal fluid movement. During the passage of these fluids through the volcano-sedimentary and granitic country rocks, elements such as Ca, Na, U and Ti were mobilized, concentrated and transported. Movement of these hydrothermal solutions has been facilitated by pre-existing faults and more permeable lithological horizons. Eventually, under favourable physico-chemical conditions, the precipitation of certain elements and removal of others has resulted in the formation of alkali metasomatites and later uranium mineralization. 27 refs., 7 figs., 6 tabs.

47251 (IAEA-TECDOC—361, pp 43-55) **Vein-type uranium mineral occurrences in South Greenland.** Nyegaard, P.; Armour-Brown, A.; Steenfelt, A. (Groenlands Geologiske Undersoegelse, Copenhagen, Denmark). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Many vein-type uranium mineral occurrences are located in South Greenland. These veins lie in what is termed the "Granite Zone" within the Proterozoic Ketilidian mobile belt (1900-1600 Ma). In this area the crystalline rocks were subjected to a period of faulting accompanied by the cratonic depositional and alkaline igneous activity of the Gardar period (1150-1350 Ma). The faulting is intensive and in many different directions, but is interpreted as being caused by a regional, EW orientated, sinistral stress system. The pitchblende veins and the many minor radioactive mineral occurrences are located in or associated with fault zones. U-Pb isotope analyses of the pitchblende indicate a Gardar age of 1180 +- 15 Ma. In the most extensive occurrences pitchblende and secondary uranium minerals are the most common radioactive minerals. In many of the minor occurrences brannerite is found. The gangue minerals are mainly quartz and calcite with varying amounts of specular hematite, fluorite and minor sulphides. Reconnaissance exploration results revealed that there are also uranium mineral occurrences in the Ketilidian rocks to the south of the Granite Zone. The genesis of the uraniferous veins is believed to have been controlled by the Gardar faulting, which facilitated the hydrothermal circulation of the volatiles derived from the Gardar igneous activity. The uranium itself is believed to have been derived to some extent from the highly differentiated alkaline units, but probably mostly from the older Ketilidian occurrences. 29 refs., 2 figs., 1 tab.

47252 (IAEA-TECDOC—361, pp 57-76) **Geological environment of the vein-type deposits in the Aphebian basement of the Carswell structure on the Athabasca plateau (Northern Saskatchewan). Comparison with other deposits of the same type.** Artru, P.; Berville, M.; Moreau, M.; Tona, F. (Compagnie Generale des Matieres Nucleaires, COGEMA, 78 - Velizy, Villacoublay, France). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Cluff Lake basement deposits are characterized by their stratigraphic position in or close to a dominantly aluminous, graphitic and pyritic metasedimentary formation (Peter River gneiss), most probably a former black shale. They are also close to an underlying unit consisting of quartzo-feldspathic gneisses (Earl River Complex) which could be a former arkosic sandstone, metamor-

phosed and reactivated. This latter unit is mainly found in the heart of dome shaped anticlines (mantled gneiss domes). The reactivation process created favourable conditions for mobilization of uranium into small concentrations early (1800 Ma) in the metamorphics. The main structural control of the deposits appears to be Hudsonian mylonites and subsequent fracturation. However, it is after the deposition of the Athabasca Sandstone that the mylonites and their associated fractures were rejuvenated and invaded by hydrothermal fluids. A widespread alteration pervaded through the surrounding rocks and uranium precipitated in the open fractures. Several phases with different praragenesis can be identified with ages spreading from 1200 Ma to 900 Ma although some remobilization occurred much later. The 480 Ma violent tectonic event associated with the formation of the Carswell structure and the injection of the Cluff Breccia further complicated the structure, partially obscuring the earlier events. The unconformity deposits are represented in Cluff Lake by the well known D deposit. An important Hudsonian mylonite is the main link between this deposit and the Peter River basement deposit. The ages of both mineralizations are similar, leading to the conclusion that both result from the same long mineralizing process. Adaptation of this process to different lithological environments gave birth to two very different types of deposits. 52 refs., 7 figs.

47253 (IAEA-TECDOC—361, pp 77-84) **Pandanus Creek Uranium Mine, Northern Territory, Australia.** Morgan, B.D.; Campi, D. (Triad Minerals N.L., Melbourne, Australia; Metals Exploration Ltd., Melbourne, Australia). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The Pandanus Creek Uranium Mine was discovered in 1958 and selectively mined between 1960 and 1962 for a yield of 26 t U_3O_8. The mine is situated on a tectonic ridge of Lower Proterozoic metamorphics intruded by a granite complex with comagmatic acid volcanics of basal Middle Proterozoic age (1770 Ma). The volcanics are the mine host rocks. The primary ore consists of lenses of pitchblende along shears developed within a meta-quartzite adjacent to a granite intrusion. The pitchblende has suffered extensive supergene alteration due to tropical weathering since Mesozoic times. The core contains significant gold and silver. The pitchblende was emplaced 850 Ma ago, after widespread faulting of overlying Middle Proterozoic rocks. The source of the uranium is believed to be the basement rocks of the tectonic ridge. Hydrothermal solutions ascended along the major faults and deposited pitchblende preferentially in adjacent minor structures within the volcanics. 12 refs., 3 figs.

47254 (IAEA-TECDOC—361, pp 85-100) **Structure related uranium mineralization in the Westmoreland District, Queensland, Australia.** Schindlmayr, W.E.; Beerbaum, B. (Urangesellschaft Australia Pty. Ltd., Melbourne). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The Westmoreland Uranium District straddles the boundary between Queensland and the Northern Territory of Australia some 100 km south of the coastline. Middle Proterozoic conglomerate/sandstones and a basic volcanic sequence of the McArthur River Basin unconformably overly Lower Proterozoic metamorphics and acid volcanics, both intruded by high level granites, which are exposed in an EW trending uplift. Basic dikes, thought to be feeders to the multiple basic extrusions were emplaced mainly along the NE trending structures dissecting the sandstone sequence. Uranium mineralization in the district frequently occurs as vertical or subvertical, discontinuous lenses or sheets adjacent to or within these dike filled structures. The primary minerals are uraninite and protobrannerite. Gold may occur coincidental to uranium. Uraninite is the last replacive mineral phase, following cementation and argillic alteration of the host rocks and the introduction of chlorite/hematite. The primary origin of the uranium remains open due to lack of conclusive evidence for introduction of the uranium into the system either as detrital component or by exhalative volcanogenic activity or by hydrothermal remobilization from deep seated sources. It is postulated that a heat flow event at about 820 Ma generated and maintained convection flow cells within permeable host rocks and that uranium introduced to circulating oxygenated formation waters by any one or more of the above processes was precipitated against physico-chemical barriers such as basic dikes or basaltic flows due to the abundant supply of divalid iron as reductant. 17 refs., 5 figs., 1 tab.

47255 (IAEA-TECDOC—361, pp 101-112) **Mt. Painter uranium deposits.** Youles, I.P. (Oilmin N.L., Adelaide, Australia). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The Mt. Gee, Armchair, Streitberg Ridge and Radium Ridge primary uranium deposits consist of uraninite, pyrite, chalcopyrite, molybdenite, monazite, fluorite and barite in a matrix of chlorite and hematite, which infilled and replaced, as layers, a potash rich (10% K_2O), partly sericitized, granitic breccia in the Radium Ridge Beds (interpreted about 700 Ma). Minor amounts of sandstone, siltstone, diamictite and arkose also occur. Uranium content averages 0.1% along with Cu 0.05%, Mo 0.03%, Co 0.035% and Ce group 0.5%. Isotopic data indicate a magmatic origin and fluid inclusions show temperatures of 300 deg. C - 400 deg. C with aqueous solutions of low salinity. The Hodgekinson deposit consists of uraninite with silica, pyrite, minor arsenopyrite and trace sulphides in brecciated, foliated, granitic rocks, which were silicified or kaolinized and sericitized; repetitive brecciation with infillings of uraninite, pyrite and chalcedony occurred, the latest being a secondary enrichment through downward leaching. Early mine workings are in permeable zones, usually faults, in or adjacent to primary deposits; torbernite and autunite were deposited in voids by groundwaters of probable Tertiary age. 13 refs., 5 figs., 4 tabs.

47256 (IAEA-TECDOC—361, pp 113-142) **Petrographic-geochemical characteristics and genesis of an albitized uraniferous granite in Northern Cameroon, Africa.** Oesterlen, M.; Vetter, U. (Urangesellschaft m.b.H. und Co. K.G., Frankfurt am Main, Germany, F.R.; Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover, Germany, F.R.). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

A petrographic and geochemical investigation of an albite-uraninite paragenesis associated with the Panafrican Kitongo granite was made. Several distinct mineralization phases were identified. Partial melting of a granodioritic source rock produced a restite-bearing I-type monzogranite in the magmatic stage. The granite ascended synorogenically in tectonic structures and intruded volcanosedimentary rocks of upper amphibolite facies, which occur in the granite as xenoliths. Residual late-magmatic melts enriched in K or Na were formed locally. In the post-magmatic stage, the granite was first affected by two phases of pneumatolytic to hydrothermal metasomatism: a first albitization led to the replacement of plagioclase by albite, the alteration of hornblende to Na-Ca amphibole, and the formation of a Zr-Ce-La mineralization. In the second albitization phase, the potassium feldspar component of the alkali feldspar and the quartz was replaced by albite, proceeding in steps until replacement was complete. Additional Zr, Ce, and La were introduced again, but remobilization of these elements also occurred. Riebeckite and aegirine were formed and partly altered. The hydrothermal phase of uraninite mineralization followed and then two late-hydrothermal phases: a quartz-epidote-carbonate paragenesis and an economically insignificant sulfide mineralization. The post-magmatic events are restricted to a region of jointed and sheared granite along the Kitongo fault zone. A comparison with other albite-uranium occurrences shows that in contrast to the Kitongo occurrence, which is in an I-type granite, most of the deposits of this type are in S- and A-type granites. This explains differences between the Kitongo occurrence and the others, e.g. different uranium phases and a lack of enrichment of Sn, W, F, Li, Nb, Ta, and Y. 36 refs., 24 figs., 2 tabs.

47257 (IAEA-TECDOC—361, pp 143-157) **Uranium-bearing siliceous veins in younger granites, Eastern Desert, Egypt.** Hussein, H.A.; Hassan, M.A.; El-Tahir, M.A.; Abou-Deif, A. (Nuclear Materials Corp., Cairo, Egypt). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The post-tectonic younger granites of Egypt represent the magmatic activity marking the end of the cratonization process of the Pan-African Orogeny. Several of these plutons are hosts of rare metal mineralization in the Eastern Desert of Egypt. Two of them, namely El-Erediya and El-Missikat plutons, are hosts of siliceous vein-type uranium mineralization. In both occurrences, the mineralization is structurally controlled by faults and their feather joints which are associated with NE to ENE shear zones. Widespread silicification, and to a lesser extent kaolinization and sericitization, as well as other alterations accompany the uranium mineralization. Uranium is concentrated in the centre of the mineralized faults and fractures together with jasper (in El-Erediya) or black silica and to a lesser extent jasper (in El-Missikat). Pitchblende is the primary mineral which suffered intensive oxidation and probably leaching relics protected by silica. This resulted in a spotty distribution of uranium and radioactivity in the oxidation zone. Present data suggest an origin by hydrothermal fluids derived, most probably, from the younger granite magma. Uranium was derived from the magma itself, or from another deep source. Contributions from the granitic plutons by leaching through circulation of meteoric waters cannot be ruled out at the present state of knowledge. (author). 26 refs, 9 figs, 5 tabs.

47258 (IAEA-TECDOC—361, pp 159-168) **Geology and origin of the Schwartzwalder uranium deposit, Front Range, Colorado, USA.** Wallace, A.R. (Geological Survey, Denver, CO, USA). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The Schwartzwalder uranium deposit in Colorado was formed from evolved connate fluids which leached all the vein mineral components from the host metamorphic terrane. The metamorphic rocks were deposited in a Proterozoic submarine environment with associated volcanic activity. Uranium mineralization occurred 69.3+-1.2 Ma ago during incipient uplift of the crystalline block of the Front Range. Carbonate-rich fluids produced successive carbonate-sericite and hematite-adularia alteration assemblages in the wall rocks around fractures in the metamorphic rocks. Three stages of subsequent vein mineralization generated massive pitchblende veins with carbonate, sulfide, and adularia gangue. Breccia dikes composed of remobilized fault gouge and ore were emplaced both before and after pitchblende deposition. The alteration and vein assemblages were produced during repeated major movement along faults in the basement. Fault movement across a narrow zone of brittle rock in the metamorphic sequence provided a permeable conduit along which the hydrothermal fluids ascended. Episodic brecciation dramatically reduced the large confining pressure and induced CO_2 evolution. This process simultaneously increased the pH, decreased the $f(O_2)$ and $f(CO_2)$, and led to the alteration of the wall rocks and the subsequent deposition of adularia, carbonates, and pitchblende in the veins. Reduced and intermediate sulfur species in solution reduced the uranium carried in solution. Geologic evidence and carbon, sulfur, oxygen, and lead isotopic data require that the components for the vein minerals were derived almost entirely from the metamorphic terrane, and that sedimentary and magmatic sources were volumetrically insignificant at best. The fluids were probably originally of meteoric derivation and resided in deep fracture zones for much of the Mesozoic. 6 refs, 3 figs.

47259 (IAEA-TECDOC—361, pp 169-180) **Geology and genesis of uranium deposits at the Pitch Mine, Saguache County, Colorado.** Nash, J.T. (Geological Survey, Denver, CO, USA). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Uranium ore in the Pitch Mine, Saguache County, Colorado, occurs mainly along the Chester fault zone, in fault slices that make up the footwall of the Chester upthrust. The ore occurs in the Mississippian Leadville Dolomite, in sandstone, siltstone, and carbonaceous shale of the Pennsylvanian Belden Formation, and in Precambrian granitic rocks and schist. About half of the ore is in the dolomite. Chemical analyses of 116 rock and ore samples demonstrate that ore-bearing dolomites are significantly enriched in FeO, K_2O, S, Mo, Cu, and Ni. Some statistical tests suggest that SiO_2, Al_2O_3, Ba, Sr, Pb, Zn, and V are also enriched with uranium. The strong association of uranium with sulfur, iron, and molybdenum is most important geochemically. The Leadville Dolomite is the most important host for uranium in the Pitch Mine, but other units contain important uranium resources where fractured along the Chester fault zone. Brittle character is a prime requirement for favourable host rocks. Chemical properties of host rocks are also important. The most likely time of formation is the Oligocene, when volcanic rocks covered the fault zone. Observed and interpreted features at the Pitch deposit suggest a model of ore formation that has wide application around the world. Key factors are: a wide zone of brecciation in brittle rocks, as is commonly produced by upthrusts, a reductant provided by reactive pre-ore sulfide minerals or organic material and sulfate-reducing bacteria and a viable source of uranium, such as altered volcanic rocks. Pitch mine-type deposits may contain 2,000-30,000 t U_3O_8 with mixed high and low grades. 19 refs, 3 figs, 2 tabs.

47260 (IAEA-TECDOC—361, pp 181-191) **Uranium veins in Portugal.** Basham, I.R.; Matos Dias, J.M. (British Geological Survey, Edinburgh; Empresa Nacional de Urano, Urgeirica, Portugal). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Vein-type uranium deposits in Portugal demonstrate a broad temporal and physical spectrum from intragranitic hydrothermal jasper-type veins formed at moderately high temperatures, through lower temperature quartz veins and peribatholithic disseminated mineralization of 'Iberian-type', to undoubted supergene enrichments in surface-related planar traps such as weathered basic dikes. All appear to be in close spatial relationship to 'fertile' Hercynian granites in which uraninite of low thorium content is the main contributor to the enriched uranium levels. The availability of this large source of labile uranium, a pervasive fracture network and a series of tectonic and intrusive events which could generate hydrothermal circulation, allow several alternative genetic models for the mineralization. It now appears that the classic hydrothermal pitchblende veins within the granite are most likely of late-Hercynian age. Many of the mineralogical and depositional characteristics of the lower temperature 'Iberian-type' deposits suggest a temporal continuity to this mineralization but, as yet, no supporting age data are available. It is conceded, therefore, that a considerable time-gap could occur between the two episodes, with the peribatholithic mineralization resulting from later rejuvenation of the hydrothermal convective system. 23 refs, 1 fig.

47261 (IAEA-TECDOC—361, pp 193-214) **Origin of uranium vein deposits in metasedimentary rocks: Fe Mine, Salamanca (Spain).** Arribas, A. (Universidad de Salamanca, Spain). Jan 1986. (In Spanish). NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

In this paper, taking into account field and laboratory studies carried out recently in the Fe Mine, so far the most important Spanish U deposit of this kind, the mineralization hypotheses are discussed and the main metallogenic features of the orebody are given. Among these, the most significant are: the high geochemical U content, 30 to 200 ppm, of the schist-graywacke complex (CEG) carbonaceous slates prevalent in the area; the nature and alteration processes, chloritization and hematitization of the host rocks; the radiometric age of the pitchblende 37 to 57 Ma; the low temperature mineral association; the peculiar gravitational textures of the ore minerals; the temperature and salinity of the fluid inclusions of the carbonates, ranging from 230°C to less than 70°C, and from 0 to 25% NaCl equiv. respectively; and the shallow tectonic activity giving place to the hydraulic fracturing and fault breccias controlling the ore deposition. Finally, the Fe orebody is compared with

similar U deposits in Spain and elsewhere, and the origin of the mineralization is attributed to seismic pumping of U contained in the CEG carbonaceous slates. According to this model, the strains developed in the Hercynian basement around shear zones resulting from the Alpine tectonic activity, during Lower to Middle Tertiary times, would have given rise to episodic remobilizations of the U by hydrothermal fluids. Consequently, when the dilatant zones collapsed, these U-bearing solutions, geothermal in character, were expelled towards the surface depositing the U and accompanying minerals in fractures and breccias associated to the wrench faults. 28 refs, 20 figs, 2 tabs.

47262 (IAEA-TECDOC—361, pp 215-246) **Uranium deposits spatially related to granites in the French part of the Hercynian orogen.** Poty, B.; Leroy, J.; Cathelineau, M.; Cuney, M.; Friedrich, M.; Lespinasse, M.; Turpin, L. (CREGU, Vandoeuvre-les-Nancy, France). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

During the last ten years, a number of research projects have been conducted on the French part of the Hercynian orogen especially on the vein-type uranium deposits. This paper is a review of the new concepts worked out on this type of uranium occurrences. Sources for uranium mobilization and metallogenic stages appear to be more diversified and complex than suggested in previous models. In particular, an intermediate stage of uranium concentration, structurally controlled, occurring at a late magmatic stage and related to uranium enriched fine grained intrusions has been discovered in the Saint-Sylvestre and Bois Noirs granites. Uranium metallogenesis for vein-type deposits appears now to occur during four main periods: Middle Palaeozoic, Early Permian, Jurassic, and Alpine to the present day. The physico-chemical conditions of 'episyenites' formation and uranium deposition have been largely revised by additional mineralogical and fluid inclusion studies, and by the development of stable and radiogenic isotope measurements. Origin of the fluids related to 'episyenitization' and uranium mineralizations has been outlined. All these studies have considerably reinforced the hydrothermal genetic model for the Hercynian vein-type uranium mineralizations. 112 refs, 13 figs, 1 tab.

47263 (IAEA-TECDOC—361, pp 247-260) **Uranium deposit 'Krunkelbach' in the Southern Black Forest, Federal Republic of Germany.** Bueltemann, H.W.; Bueltemann, W.D. (Gewerkschaft Brunhilde, Uetze, Germany, F.R.). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The hydrothermal uranium deposit of the Krunkelbach valley close to the village of Menzenschwand lies in the southern Black Forest of the Federal Republic of Germany. It is still being explored from surface and underground. The deposit is in the contact zone between the Variscan Baerhalde granite - a typical two-mica granite - and the gneiss massif of the Feldberg. The ore veins strike E and NW. The mineralization was localized by a well developed NNW striking fault zone. The main uranium mineral is pitchblende of different generations. A great number of secondary uranium minerals have been recognized. Gangue material consists of various generations of carnelian or jasper, barite and fluorite. 22 refs, 5 figs, 6 tabs.

47264 (IAEA-TECDOC—361, pp 261-274) **Grossschloppen-Hebanz uranium occurrences - a prototype of mineralized structure zones characterized by desilicification and silicification.** Dill, H.G.; Kolb, S.G. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover, Germany, F.R.; Esso Erz GmbH, Nuernberg, Germany, F.R.). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The uranium occurrences at Grossschloppen and Hebanz are situated along the northern margin of the Fichtelgebirge close to the Muenchberg Gneiss Massif. They belong to the vein-type uranium metallogenic province of the western edge of the Bohemian Massif. The granite-metasediment contact is crosscut by NNW to NW trending faults some of which are mineralized by uranium oxides, sulfides and selenides. The mineralization controlling structures at Grossschloppen and Hebanz are enveloped by alteration zones showing an opposing trend of silica migration. At Grossschloppen six alteration stages are recognized. They are separated by tectonic hiati and characterized by different quartz modifications and U minerals. During the first stage the major portion of the uranium was concentrated as spherulitic and layered pitchblende. The uranium oxide was replaced during the later stages by younger quartz, selenides and sulfides along shrinkage cracks and rhythmic banding followed by dolomite, barite, fluorite and calcite. The mineralization belongs to the 'polymetallic U paragenesis' (uranium oxides associated with various sulfides, arsenides, selenides and native elements of Fe, Cu, Zn, Pb, Bi, Co, Ni, Au). Specularite is a common Fe-oxide in various stages. The quartz veins are stained by secondary uranium minerals (uranophane, torbernite) along hairline cracks and fractures. The secondary minerals also coat the primary uranium oxides. The primary age of the mineralization is Late Permian to Early Triassic. The re-deposition of uranium under oxidizing conditions as well as cementation phenomena indicated by the occurrence of native copper took place during the Miocene and Pliocene peneplenation. 24 refs, 7 figs, 1 tab.

47265 (IAEA-TECDOC—361, pp 275-291) **Fault-controlled uranium black ore mineralization from the western edge of the Bohemian Massif (NE Bavaria, FR Germany).** Dill, H.G. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover, Germany, F.R.). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Structurally controlled epigenetic U black ore mineralizations (U oxides, U titanates, U silicates) are found in the geotectonic units of the Saxothuringian (Frankenwald, Fichtelgebirge) as well as in the Moldonubian (Oberpfaelzer Wald, Bayerischer Wald) of the Variscan orogen. These vein-type occurrences may be classified into three principal types with respect to their structural properties: fault zones with stockwork-like ore shoots, mineralized structure zones, veins s.str. Two characteristic uranium parageneses were determined within the different ore-bearing fractures intersecting the crystalline basement in NW to NNW direction. The so-called 'monotonous uranium paragenesis' is characterized by its simplicity of element composition (U, Si, Fe, Ti) but variable bonding of U (brannerite, 'U leucoxene', neouraninite, pitchblende, 'sooty pitch', coffinite, U-Ti silicates, coffinite). Contrary the 'polymetallic uranium paragenesis' displays a variety of element combinations (U, As, Au, Bi, Co, Ni, Sb, Se, Cu, Fe, Pb, Zn), which is responsible for different sulfides, selenides, arsenides and native elements. Uranium is only observed within pitchblende, its highly oxidized decomposition products, and to a rare extent within coffinite. Selenides are considered to be diagnostic for that mineralization. Judging from the structural properties and from the mineralogy of those vein-type occurrences in NE Bavaria they may act as a transition between the uranium ore deposits known in France and those from Czechoslovakia within the Mid-European U Belt. 45 refs, 8 figs, 2 tabs.

47266 (IAEA-TECDOC—361, pp 293-305) **Uranium deposit of Jachymov, Czechoslovakia.** Kominek, J.; Vesely, T. (Ceskoslovensky Uranovy Prumysl, Pribram; Uranovy Pruzkum, Liberec, Czechoslovakia). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The uranium deposit of Jachymov (Joachimsthal) lies in the Krusne hory Mountains (Erzgebirge), the NW part of the Bohemian Massif. The geology of the area is built up by metamorphic rocks of the Krusne hory complex and by magmatic rocks of the Variscan Karlovy Vary (Karlsbad) Massif. The uranium ore occurred within NW-NE trending vein systems which can be subdivided into seven individual groups of veins. Most of these veins are carbonate-pitchblende veins, but there are also carbonate-arsenide and quartz-sulfide-bearing veins. The uranium mineralization is concentrated in individual ore lenses or ore pots, which occur mainly where the dip of the veins is not as steep as usual. Four different types of ore control can be recognized: besides structural and litho-

logical ore control there seems to exist also a close relationship between the mineralization and the morphology of the granite intrusion and the mineralogical composition of the veins. The Jachymov uranium deposit is a good example for a hydrothermal vein deposit of the five element types (Ni, Co, Bi, Ag, U). 4 refs, 8 figs.

47267 (IAEA-TECDOC—361, pp 307-317) **Uranium deposit of Pribram, Czechoslovakia.** Petros, R.; Prokes, S.; Kominek, J. (Uranove Doly, Pribram, Czechoslovakia. Odstepny Zavod; Ceskoslovensky Uranovy Prumysl, Pribram). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The uranium deposit of Pribram is the best example for a hydrothermal vein deposit of the Bohemian Massif. It belongs to the Central Bohemian ore district and occurs at the contact between the Central Bohemian granite and weakly metamorphosed sediments of the Upper Proterozoic. The NW-NE trending veins are irregularly distributed. Two types of vein systems can be distinguished: the first is closely associated with NE trending faults, the second type occurs in the continuation of the NW striking structural zone within an anticline of Proterozoic sediments. The mineralization of the veins formed during four phases. The ore deposit represents a classic example of the carbonate-pitchblende ore formation. The main gangue mineral is calcite of different generations, the important ore minerals are pitchblende, anthraxolite and coffinite. Over 50 different secondary minerals have been identified. Main ore control are structural features, whereas lithological ore control can only be recognized on a more regional scale. Besides uranium, the Pribram uranium deposit contains some polymetals and native silver. The age of mineralization is Late Variscan (270 Ma) and was caused by low temperature solutions. The formation of the deposit is closely connected with the intrusion of Variscan granitoids of the Central Bohemian Pluton. 10 refs, 5 figs.

47268 (IAEA-TECDOC—361, pp 319-333) **Contribution to the problems on pre-Variscan precursors of uranium vein deposits in the Bohemian Massif.** Strnad, J.G. (Uranerz Exploration and Mining Ltd., Saskatoon, Saskatchewan, Canada). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The regional U background of the pre-Variscan metamorphics yields clarke values or less. Only locally, within the folded and slightly metamorphosed Upper Proterozoic volcano-sedimentary sequences were enhanced U values of Cadomian age localized. Except for the sheared portions of these U-anomalous stratabound bodies, no further enrichment was observed, while their non-anomalous extension in a broader vicinity (at the contact with Variscan granites) encompasses a few small U deposits. Also, the major vein deposits which belong to the Pribram Zone are hosted by their distal (65 km) and broader stratigraphic equivalent, and again, in a series containing only slightly enhanced U values. Unless the rocks surrounding these deposits are depleted in U, either/or U-anomalous and U-common lithologies could then contribute to the formation of a vein deposit, provided that enrichment processes took place during a subsequent orogeny. Within the broad regional Variscan overprinting, the exclusively effective deposit-generating conditions were fulfilled only at selective sites. These were the broad areas at the intersections of deep-seated structures which, in turn, followed the boundaries of several structural blocks with differing crustal thicknesses and composition, specific thermal regimes, opposing vertical movements and distinct volcanism and magmatism. Three such zones and their two intersections conditioned the development of two principal Variscan U-vein accumulations from the Proterozoic precursors. 31 refs, 4 figs.

47269 (IAEA-TECDOC—361, pp 335-357) **Two uranium deposits in the Polish part of the Sudety Mountains.** Banas, M.; Mochnacka, K. (University of Mining and Metallurgy, Krakow, Poland). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

Two vein-type polymetallic-uranium deposits are described from the Sudęty Mountains, Poland. These are the Kletno deposit and the Kowary deposit. The Kletno deposit is located in metamorphic rocks, forming the tectonic complex of Snieznik Klodzki. The ore veins are following either cataclastic quartz zones adjoining magnetite-bearing skarns or nests of black fluorite. The mineralization consists of pitchblende, sooty pitchblende and other secondary U minerals like gummite, four-marierite, uranophane, metatorbernite and autunite. Magnetite, hematite, pyrite, phyrrhotite, native gold, native silver, sulphides, sulphosalts and selenides of Pb, Zn, Cu, Ag, Bi, Hg, Sb are also present. The ore has six different types of mineral assemblages and parageneses. The polymetallic-uranium mineralization is controlled by two factors: geochemical uranophile environment and intense tectonization causing zones of small fracture type. The Kowary deposit is located in the southeastern part of the metamorphic cover of the Karkonosze Granite. In the west, a main fault cuts this formation. This fault is of particular significance for the uranium mineralization processes. Two morphologically different types of uranium deposits are distinguished: stockwork deposit and vein deposit. The main ore minerals are pitchblende, accompanied by coffinite, sulphides, sulphosalts, and selenides of As, Co, Ni, Ag, Bi, Cu, Pb, Hg, native Ag, pyrite, and sometimes secondary uranium minerals. Both deposits seem to be typical hydrothermal mineralizations belonging to the large family of deposits asssociated with the Variscan orogenesis in Europe. 27 refs, 27 figs, 3 tabs.

47270 (IAEA-TECDOC—361, pp 359-376) **Vein uranium deposits in granites of Xiazhuang ore field.** Li Tiangang; Huang Zhizhang. (Uranium Geology Research Inst., Beijing, China). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The Xianzhuang ore field is one of the important uranium districts of China from which substantial uranium resources are known. It lies within the Caledonian orogenic belt, where during the Yenshanian tectonic phase intensive tectono-magmatic activities took place. All uranium ore deposits of this district belong to the vein-type uranium deposits being mainly characterized by a pitchblende-microquartz assemblage closely associated with an argillitization-pyritization alteration of the host rock. These deposits are located in a down-faulted block within the Guidong granite massif, which is characterized by a quite perfect granitic differentiation together with an intensive autometamorphism. The granite contains higher uranium and uraninite values. The age of the rock-forming period is 185 to 135 Ma, but the ore-forming period is 85 to 70 Ma. Thus the source of uranium must have been the consolidated granite itself. Fluid inclusion data and stable isotope information show that the ore formation took place mainly between 280 to 150°C under abruptly decreasing pressure conditions and significant escaping of gases. 10 figs, 10 tabs.

47271 (IAEA-TECDOC—361, pp 377-393) **Granite-type uranium deposits of China.** Du Letian. (Uranium Geology Research Inst., Beijing, China). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The granite-related uranium deposits of China are of acid hydrothermal and alkaline hydrothermal origin. Their geological features, the correlation with each other and their metallogenesis are discussed. The close relationship of the uranium mineralization with the geotectonic history and the existence of a 'carapase of ore formation' as a barrier for precipitation and concentration of uranium from ascending solutions are emphasized. 3 refs, 15 figs, 11 tabs.

47272 (IAEA-TECDOC—361, pp 415-423) **Metallotectonic control of the uranium mineralization in vein-type deposits of Central Iran (Anarak District).** Espahbod, M.R. (Atomic Energy Organization of Iran, Teheran). Jan 1986. NTIS (US Sales Only), PC A18/MF A01. File Number DE86703159.

In Vein type uranium deposits. Report of the Working Group on Uranium Geology.

The investigated area lies in Central Iran and belongs geologically to the Central Iran Fold Belt. The Talmesi-Meskani Intermountain Basin lies within this belt and is built up by Cretaceous and Tertiary sediments and volcanics. The basin was subject to intense faulting and folding. Cu, Ni, Co, U mineralizations occur within shear and breccia zones of andesite porphyrites and trachyandesites. These volcanic rocks only serve as host as the uranium derived from late stage two mica granites which underwent intense albitization. The Talmesi and Meskani copper mines are multistage, hydrothermal uranium occurrences within well developed shear and fracture zones. (author). 6 refs, 6 figs, 1 tab.

0503 Mining

REFER ALSO TO CITATION(S) 47253

0504 Feed Processing

REFER ALSO TO CITATION(S) 47340, 48081

0505 Enrichment

REFER ALSO TO CITATION(S) 47344, 48251, 48251

0507 Fuels Production And Properties

REFER ALSO TO CITATION(S) 47506

47273 (INIS-mf—10197, pp 13-36) **Improved fabrication methods for fuels containing plutonium.** Roepenack, H. (Alpha Chemie und Metallurgie G.m.b.H., ALKEM, Hanau, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

The selection of methods to be used depends on the condition of the Pu delivered. For Pu nitrate, the AUPuC-Ko-conversion method presents itself whereas for PuO_2 the Ko grinding method (OKOM) should be applied. Both methods are far loss complex than the ALKEM standard method. No more than about 10-15% of all fuel produced are concerned. The OKOM method is already being applied in the fabrication of reload fuel elements for the KNK II reactor.

47274 (ORNL/TM—8999) **Accelerator breeder nuclear fuel production: concept evaluation of a modified design for ORNL's proposed TME-ENFP.** Johnson, J.O.; Gabriel, T.A.; Bartine, D.E. (Oak Ridge National Lab., TN (USA). Engineering Physics and Mathematics Div.). Jan 1985. Contract AC05-84OR21400. 57p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86013420.

Recent advances in accelerator beam technology have made it possible to improve the target/blanket design of the Ternary Metal Fueled Electronuclear Fuel Producer (TMF-ENFP), an accelerator-breeder design concept proposed by Burnss et al. for subcritical breeding of the fissile isotope ^{233}U. In the original TMF-ENFP the 300-mA, 1100-MeV proton beam was limited to a small diameter whose power density was so high that a solid metal target could not be used for producing the spallation neutrons needed to drive the breeding process. Instead the target was a central column of circulating liquid sodium, which was surrounded by an inner multiplying region of ternary fuel rods (^{239}Pu, ^{232}Th, and ^{238}U) and an outer blanket region of ^{232}Th rods, with the entire system cooled by circulating sodium. In the modified design proposed here, the proton beam is sufficiently spread out to allow the ternary fuel to reside directly in the beam and to be preceded by a thin (nonstructural) V-Ti steel firThe spread beam mandated a change in the design configuration (from a cylindrical shape to an Erlenmeyer flask shape), which, in turn, required that the fuel rods (and blanket rods) be replaced by fuel pebbles. The fuel residence time in both systems was assumed to be 90 full power days. A series of parameter optimization calculations for the modified TMF-ENFP led to a semioptimized system in which the initial ^{239}Pu inventory of the ternary fuel was 6% and the fuel pebble diameter was 0.5 cm. Witl. this system the ^{233}Pu production rate of 5.8 kg/day reported for the original TMF-ENFP was increased to 9.3 kg/day, and the thermal power production at beginning of cycle was increased from 3300 MW(t) to 5240 MW(t). 31 refs., 32 figs., 6 tabs.

0508 Spent Fuels Reprocessing

REFER ALSO TO CITATION(S) 47305, 47506, 48138

47275 (CEA-CONF—8006) **New extractants for nuclear fuels.** Musikas, C. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Recherche Technologique et de Developpement Industriel (IRDI)). 1985. 17p. (In French). (CONF-8506281—1). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750853.

From Colloquium on solvent extraction and ions exchange; Toulouse, France (5 Jun 1985).

Modification of the Purex process by replacement of TBP by N,N'-dialkylamides is examined and also separation of long-life alpha emitters from high-level radioactive wastes by N-N'-dialkylmalonamides (DMDOMA). Degradation products, incineration, extractive properties, partition coefficient, selectivity, diluants and complex formation are studied. Amides are promising for decreasing radioactive wastes production.

47276 (CEA-R—5322) **Temperature and composition effect on the volumic masses of uranium and plutonium nitric acid solutions.** Cauchetier, P. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Recherche Technologique et de Developpement Industriel (IRDI)). Sep 1985. 27p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750859.

With an oscillating U-tube densimeter, we measured at different temperatures the volumic masses of uranium, plutonium and nitric acid solutions. By multiple linear regression analysis we found the representative equation of the different parameters influence on the volumic mass. We have obtained from the tabulated data the representative equation of the pure water between 15 and 40°C with a better precision than $2.10^{-6} g.cm^{-3}$. From our own results we have obtained the equations concerning the nitric acid between 0 and 8 M at 20°C, then between 15 and 40°C. The agreement with our experimental results and with the tabulated data at 20°C is in some $10^{-4} g.cm^{-3}$ range. At last the general equation which comprises the above found terms is in concordance with the experimental results in $+-1,2.10^{-3} g.cm^{-3}$ bracket in the scanned range ($20°C <= t <= 35°C$ - $2 M <= [HNO_3] <= 4 M$ - $1 gl^{-1} <= [U] <= 150 gl^{-1}$ - $1 gl^{-1} <= [Pu] <= 65 gl^{-1}$). Nevertheless we are not able to explain the difference of $2.3 \times 10^{-3} g.cm^{-3}$ between the constant term of this equation and the choosed origin (the volumic mass of the pure water at 20°C). The variations observed between our results and these determined in other laboratories for two constituents systems may be explain by errors in free acidity measurements where these is still no complete agreement between laboratories.

47277 (INIS-mf—9897) **Influence of different concepts for the limitation of dose rates on desirable measures for the retention of aerosols and radioiodine from fuel reprocessing plants.** Horn, H.G.B. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 20 Feb 1984. 160p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE86752570.

By the example of a fuel reprocessing plant for spent fuel elements from LWR-type reactors, the dose limit concepts for the assessment of the actual individual dose received in the vicinity of nuclear facilities and for the collective dose equivalent induced by the emissions (T, C-14, Kr-85, I-129) are analysed. The assessment of the most economic retention devices is done by a cost-benefit analysis. The maximum permissible annual emission rates are determined.

47278 (INIS-mf—10197, pp 45-54) **Mechanical decladding of fuel elements.** Zimmermann, G. 1981. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

Mechanical decladding and desintegration of irradiated fuel elements is not a problem any more. There are now methods at hand enabling the extensive preliminary desintegration of fuel elements, i.e. singulizing of fuel rods, by the use of tested rod row cutting machine or by cutting across the entire fuel element cross section.

47279 (INIS-mf—10197, pp 55-72) **Decladding of fast breeder reactor fuel elements with lattice spaces.** Bestenreiner, G. (Internationale Atomreaktorbau G.m.b.H., INTERATOM, Bergisch Gladbach, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

The method of decladding and desintegration of fuel rods is already applicable. The paper deals with the marginal conditions relevant for the desintegration (deformations, decay heat, decontamination of fuel elements), R and D work performed by INTERATOM so far and related results. The resulting courses of desintegration for SNR-300 Mk Ia or Mk II fuel elements and first practical experience made with the desintegration of KNK-II fuel elements at the KfK's hot cells are discussed. Finally a desintegration device for SNR-300 first core fuel elements designed in accordance with the aforesaid results is presented.

47280 (INIS-mf—10203) **Wackersdorf fuel reprocessing plant.** (Deutsches Atomforum e.V., Bonn (Germany, F.R.)). Aug 1985. 10p. (In German). NTIS (US Sales Only), PC A02/MF A01. File Number DE86752595.

Analysen (Deutsches Atomforum). No. 16.

The Deutsche Atomforum presented a summary documention as per licencing date for the Wackersdorf fuel reprocessing plant. It includes a description of the site location, of the plant, plant data, information on the licencing procedure, the contribution of fuel reprocessing plant to a waste management concept and to closing the nuclear fuel cycle, experience gained in the reprocessing of nuclear fuels, questions of profitability and consequences for the electricity prices. The Wackersdorf fuel reprocessing plant will be built by a consortium of renowned specialized companies headed by KWU. The capital investment required will be in the range of 5.200 million DM (1984 quotation). Exact investigations of the cost situation showed that the plant will, at a high degree of availability to be expected due its technical equipment, operate price-competitively as compared with plants abroad. To finance the plant, reserves will be used which the parent companies of DWK operating the plants have accumulated already and which are included in present electricity price calculations.

47281 (UJV—7295-CH,T) **Remote handling equipment for laboratory research of fuel reprocessing in Nuclear Research Institute at Rez.** Fidler, J.; Novy, P.; Kyrs, M. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Apr 1985. 10p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703154.

Laboratory installations were developed for two nuclear fuel reprocessing methods, viz., the solvent extraction process and the fluoride volatility process. The apparatus for solvent extraction reprocessing consists of a pneumatically driven rod-chopper, a dissolver, mixer-settler extractors, an automatic fire extinguishing device and other components and it was tested using irradiated uranium. The technological line for the fluoride volatility process consists of a fluorimeter, condensers, sorption columns with NaF pellets and a distillation column for the separation of volatile fluorides from UF_6. The line has not yet been tested using irradiated fuel. Some features of the remote handling equipment of both installations are briefly described.

0509 Transport And Storage

REFER ALSO TO CITATION(S) 48238, 48252

47282 (CONF-860417—Vol.1) **Third international spent fuel stroage technology symposium/workshop: proceedings. Volume 1.** (Pacific Northwest Lab., Richland, WA (USA); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Electric Power Research Inst., Palo Alto, CA (USA); Ontario Hydro, Toronto (Canada)). 1986. 427p. NTIS, PC A19/MF A01; 1; GPO Dep. File Number DE86014260.

From 3. international symposium/workshop on irradiated fuel storage; Seattle, WA, USA (8 Apr 1986).

The scope of this meeting comprised dry storage and rod consolidation, emphasizing programs on water reactor fuel with zirconium alloy cladding. Volume 1 contains the symposium papers, together with the question/answer sessions that followed the presentations. Four sessions were held: Dry Storage System Tests, Demonstrations and Analyses; At-Reactor and Central Storage Facilities; Dry Storage Integrity; and Rod Consolidation Technology and Demonstrations. Individual papers were processed for inclusion in the Energy Data Base.

47283 (CONF-860417—Vol.2) **Third international spent fuel storage technology symposium/workshop: proceedings. Volume 2.** (Pacific Northwest Lab., Richland, WA (USA); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Electric Power Research Inst., Palo Alto, CA (USA); Ontario Hydro, Toronto (Canada)). 1986. 548p. NTIS, PC A23/MF A01; 1; GPO Dep. File Number DE86014261.

From 3. international symposium/workshop on irradiated fuel storage; Seattle, WA, USA (8 Apr 1986).

The scope of this meeting comprised dry storage and rod consolidation, emphasizing programs on water reactor fuel with zirconium alloy cladding. Volume 2 contains the papers from the poster session and workshops that were conducted during the meeting. There were 18 poster presentations. Four workshops were held: Fuel Integrity; Storage System Modeling and Analysis; Rod Consolidation Technology; and System Integration and Optimization. Individual papers were processed for inclusion in the Energy Data Base.

47284 (EGG-M-T—0286) **Transporting fuel debris from TMI-2 to INEL.** Quinn, G.J.; Burton, H.M.; Bixby, W.W.; McIntosh, T.W.; McGoff, O.J.; Barkonic, R.J.; Henrie, J.O. (EG and G, Inc., Middletown, PA (USA); UNC Nuclear Industries, Inc., Richland, WA (USA). Decommissioning Programs Dept.; USDOE Technical Integration Office, Middletown, PA; USDOE, Washington, DC; Bechtel North American Power, Middletown, PA (USA); Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1986. Contract AC07-76ID01570. 8p. (CONF-860604—28; IAEA-SM—286-237-P). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013459.

From International symposium on the packaging and transport of radioactive materials (PATRAM '86); Davos, Switzerland (16 Jun 1986).

Transportation of the damaged fuel from Unit 2 of Three Mile Island (TMI-2) presented noteworthy technical challenges involving complex institutional issues. The program resulted from both a need to package and remove the accident debris and also the opportunity to receive and study damaged core components. These combined to establish the safe transport of the TMI-2 fuel debris as a high priority for many diverse organizations. The capability of the sending and receiving facilities to handle spent fuel transport casks in the most cost-effective manner was assessed and resulted in the development by Nuclear Packaging Inc. (NuPac) of the NuPac 125-B rail cask. This paper reviews the technical challenges in preparation of the TMI-2 core debris for transport from TMI-2 to the Idaho National Engineering Laboratory (INEL) and receipt and storage of that material at INEL. Challenges discussed include design and testing of fuel debris canisters; design, fabrication and licensing of a new rail cask for spent fuel transport; cask loading

operations, equipment and facilities at TMI-2; transportation logistics; and, receipt, storage and core examination operations at INEL. 10 refs.

47285 **(HE-TP—27930) Probability of traffic accidents associated with the transport of radioactive wastes.** James, I.A. (Hunting Engineering Ltd., Bedford (UK)). Jan 1986. 55p. (HE—2004/DN/010). NTIS (US Sales Only), PC A04/MF A01. File Number DE86703167.

This report evaluates the probability of a container impact during transit between generating and disposal sites. Probabilities per route mile are combined with the characteristics of the transport systems described in previous reports, to allow a comparison of different disposal options to be made.

47286 **(INIS-GB—8) Barnwood review.** (Central Electricity Generating Board, Barnwood (UK). Generation Development and Construction Div.). Sep 1985. 28p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703168.

This review describes the work of the Generation Development and Construction Division of the [U.K.] Central Electricity Generating Board. It includes work on nuclear power plants and fossil-fuel power plants. The following activities concerned with nuclear power are described: brief summary of all nuclear power work; Dungeness B; Hartlepool/Heysham 1; Heysham 2; irradiated fuel project (engineering service in support of irradiated fuel transport operation; model validation; analysis; instrumentation; impact evaluation; transportation study; full scale crash demonstration; concluding comments); remote visual inspection service.

47287 **(UCRL—93645) New approach for calibration and interpretation of IRAD GAGE vibrating-wire stressmeters.** Mao, N. (Lawrence Livermore National Lab., CA (USA)). May 1986. Contract W-7405-ENG-48. 11p. (CONF-860985—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010975.

From International symposium on rock stress and rock stress measurements; Stockholm, Sweden (1 Sep 1986).

IRAD GAGE vibrating-wire stressmeters were installed in the Spent Fuel Facility at the Nevada Test Site to measure the change in in-situ stress during the Spent Fuel Test-Climax (SFT-C). This paper discusses the results of removing a cylindrical section of rock and gages as a unit through overcoring, and the subsequent post-test calibration of the stressmeters in the laboratory. The estimated in-situ stresses based on post test calibration data are quite consistent with those directly measured in nearby holes. The magnitude of stress change calculated from pre-test calibration data is generally much smaller than that estimated from post test calibration data. 11 refs., 5 figs., 2 tabs.

0520 Waste Management

REFER ALSO TO CITATION(S) 47287, 47338, 47341, 47609, 47910, 47913, 47979, 47980, 47985, 48605, 48734, 48939, 48948, 48951, 48956

47288 **(AEEW-M—2204) Magnetic filtration of precipitated magnetite. Review of work to April 1983.** Holt, N.S.; Loft, P.R. (UKAEA Atomic Energy Establishment, Winfrith). Jun 1985. 25p. (PCMRP—85-P2). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703202.

It has been established that treatment of iron-rich alpha contaminated effluent streams by precipitating the iron as ferric floc or magnetite is an effective method of actinide removal. The work reported here shows the effect of four major parameters on the efficiency of the magnetic separation process. These are, the magnetic field strength, the structure of the matrix, the linear velocity of the magnetite suspension during filtration, and the chemical composition of the effluent stream from which magnetite is precipitated.

47289 **(AEEW-M—2205) Treatment of alpha-contaminated effluents by magnetite precipitation. Progress report from April to October 1983.** Holt, N.S. (UKAEA Atomic Energy Establishment, Winfrith). Jun 1985. 22p. (PCMRP—84-P18). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703203.

Studies of the magnetic filtration of precipitated magnetite have continued enabling data on the effect of magnetic field strength on collecting efficiency to be extended from 0.32 Tesla to 0.8 Tesla with some interesting observations. Tests have been carried out on the direct encapsulation of the magnetite loaded matrices from these runs.

47290 **(AERE-G—3528) Retardation of radionuclide transport by fracture flow in granite and argillaceous rocks. Final report (April 1983-April 1985).** Bradbury, M.H.; Green, A. (UKAEA Atomic Energy Research Establishment, Harwell. Chemistry Div.). Nov 1985. 28p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703204.

Laboratory techniques have been developed for the measurement of diffusion rates and permeabilities through highly consolidated rock samples. The work has predominantly concentrated on the generation of diffusion data for slates and granites in particular. Rock properties fundamental to mass transfer processes have been obtained. Diffusion rates have been measured through weathered granite fissure surfaces and as a function of distance from such surfaces on core samples obtained from Troon, Cornwall. Pore connectivity over metre distances in granite cores has been shown to exist and diffusion coefficients were measured as a function of confining pressure in a specially designed rig. The Dsub(i) (intrinsic diffusion coefficient) values determined at ambient pressure were approximately a factor of 2 greater than those measured at pressures equivalent to 500 m of rock overburden. Some initial experiments on the accessibility of the pore space in granites to colloids based on a permeability technique indicated that such particles neither blocked pores nor penetrated through 15 mm thick samples over times of the order 2 to 3 thousand hours. Diffusion rates through samples of Canadian granites, some of which contained weathered fissure surfaces, were measured.

47291 **(AERE-R—11960) Flow and transport in the unsaturated zone. Final report.** Jackson, C.P. (UKAEA Atomic Energy Research Establishment, Harwell. Theoretical Physics Div.). Apr 1985. 4p. H.M. Stationery Office, London, price $4.00.

The work undertaken for contract PECD 7/9/260 is summarised. It comprised an extension of the program NAMMU to unsaturated flow and a review of flow modelling in the undersaturated zone.

47292 **(ANS—612-1) Calculations of radiation field arising from heat generating radioactive waste emplaced in ocean sediments.** Patten, J.A.W. (Associated Nuclear Services, Epsom (UK)). Jan 1986. 23p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703205.

Energy deposition rates from heat generating radioactive wastes emplaced in ocean sediments have been calculated. Two disposal options are considered; a penetrator, in which waste canisters are placed and then dropped into the ocean sediments; and a drilled option in which waste canisters are placed in a bored hole. Energy deposition rates are presented in tabular and graphical form for times between emplacement (50 years cooling) and 1000 years cooling to enable radiolysis rates and hence material corrosion rates to be determined.

47293 **(BMI/OCRD—24, pp 19-39) Licensing information needs for a high-level waste repository.** Wright, R.J.; Greeves, J.T.; Logsdon, M.J. (Nuclear Regulatory Commission, Washington, DC). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

The information needs for licensing findings during the development of a repository for high-level waste (HLW) are described. In particular, attention is given to the information and needs to demonstrate, for construction authorization purposes: repository constructibility, waste retrievability, waste containment, and waste isolation.

47294 (BMI/OCRD—24, pp 41-45) **Performance assessment.** Doe, T. (Office of Crystalline Repository Development, Columbus, OH). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

The purpose of performance assessment is to show that the repository is expected to serve its stated function - disposing of radioactive waste safely both during operation and for the postclosure period. Performance assessment is a straightforward concept, but its application may be very complicated. The concept of performance assessment has been clarified by the Nuclear Regulatory Commission (NRC) in their Draft Generic Technical Position on Licensing Assessment Methodology for High-Level Waste Geologic Repositories (NRC, 1984). This document has gone a long way toward defining the criteria that the NRC will use to determine whether or not information from site characterization is adequate to meet the regulations of the Nuclear Regulatory Commission and the Environmental Protection Agency (EPA). A favorable determination is required for issuance of a construction authorization, which is the first major regulatory requirement for developing a working repository. It is, therefore, essential that a research program be developed that not only resolves the outstanding technical issues, but also does it in such a way that the results are clearly applicable to the formal performance assessment and licensing procedures. The definitions of performance assessment are reviewed and the current NRC thinking is summarized.

47295 (BMI/OCRD—24, pp 47-100) **Construction, emplacement, and retrievability (preclosure).** McClain, W. (Roy F. Weston, Inc., Germantown, MD). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

Each of the three preclosure subgroups of the Construction, Emplacement, and Retrievability Working Group adopted a six-step approach to identify and assess current needs in geotechnical modeling and characterization. This approach may be summarized as follows: identify phenomena related to emplacement of high-level nuclear wastes, identify types of models which are required to calculate the phenomena, establish the input data needs for the models, assess the current availability of the models, assess the current status of documentation, verification, and validation of the models, and determine the adequacy of instrumentation and measurement techniques to (a) validate the models, where necessary, and (b) obtain input data for design. Systematic application of these six steps leads to the establishment of the research requirements for geotechnical modeling and characterization. A summary of modeling techniques which apply to the three subsequent sections on construction, emplacement, and retrievability is presented. Research needs, which apply to all preclosure activities, are summarized.

47296 (BMI/OCRD—24, pp 101-128) **Regional groundwater system.** Long, J. (Lawrence Berkeley Lab., CA). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

The Containment and Isolation Working Group considered issues related to the postclosure behavior of repositories in crystalline rock. This working group was further divided into subgroups to consider the progress since the 1978 GAIN Symposium and identify research needs in the individual areas of regional groundwater flow, ground-water travel time, fractional release, and cumulative release. The analysis and findings of the Ground-Water Regime Subgroup are presented.

47297 (BMI/OCRD—24, pp 129-141) **Ground-water travel time.** Bentley, H.; Grisak, G. (Hydro Geo Chem, Tucson, AZ). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

The Containment and Isolation Working Group considered issues related to the postclosure behavior of repositories in crystalline rock. This working group was further divided into subgroups to consider the progress since the 1978 GAIN Symposium and identify research needs in the individual areas of regional groundwater flow, ground-water travel time, fractional release, and cumulative release. The analysis and findings of the Ground-Water Travel Time Subgroup are presented.

47298 (BMI/OCRD—24, pp 143-157) **Fractional release from the engineered barrier system.** Oversby, V.; Sagar, B. (Lawrence Livermore National Lab., CA). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

The Containment and Isolation Working Group considered issues related to the postclosure behavior of repositories in crystalline rock. This working group was further divided into subgroups to consider the progress since the 1978 GAIN Symposium and identify research needs in the individual areas of regional groundwater flow, ground-water travel time, fractional release, and cumulative release. The analysis and findings of the Fractional Release Subgroup are presented.

47299 (BMI/OCRD—24, pp 159-172) **Cumulative release to the accessible environment.** Kanehiro, B. (Hydrotechnique Associates, Berkeley, CA). Sep 1985. NTIS, PC A09/MF A01. File Number DE86001933. (CONF-8410296—).

From Geotechnical assessment and instrumentation needs for isolation of nuclear waste in crystalline rocks; Berkeley, CA, USA (15 Oct 1984).

The Containment and Isolation Working Group considered issues related to the postclosure behavior of repositories in crystalline rock. This working group was further divided into subgroups to consider the progress since the 1978 GAIN Symposium and identify research needs in the individual areas of regional groundwater flow, ground-water travel time, fractional release, and cumulative release. The analysis and findings of the Fractional Release Subgroup are presented.

47300 (CONF-841187—Vol.1, pp 33-44) **Ranking system for mixed radioactive and hazardous waste sites.** Hawley, K.A.; Napier, B.A. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Environmental Protection Agency's Hazard Ranking System (HRS) is a simplified management decision tool that provides a common basis for evaluating a multitude of hazardous waste sites. A deficiency in the HRS for application to Department of Energy mixed radioactive and hazardous waste sites is its inability to explicitly handle radioactive material. A modification to the basic HRS to add the capability to consider radioactivity is described. The HRS considers the exposure routes of direct contact, fire/explosion, atmospheric release, surface-water release, and ground-water release. Each exposure route is further divided into release, route, containment, waste, and target characteristics. To maintain the basic HRS structure, only the waste characteristics section of each exposure route was modified. A ranking system was developed, using radiation dose pathway analysis, to group radionuclides by dose factors. For mixed waste sites, the ranking factor derived for radionuclides is compared with the ranking factor obtained for hazardous chemicals and the most restrictive is used in the overall ranking. The modified HRS has the advantages of being compatible with the original HRS, has reasonable information requirements, and provides scientifically defensible conclusions. 17 references, 2 figures, 6 tables.

47301 (CONF-841187—Vol.1, pp 45-57) **Development of improved risk assessment tools for prioritizing hazardous and radioactive-mixed waste disposal sites.** Whelan, G.; Steelman, B.L. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Currently, the US Environmental Protection Agency (EPA) employs the Hazard Ranking System (HRS) to evaluate the environmental risks associated with inactive hazardous waste sites for the purpose of establishing the National Priorities List. Recently, investigators modified the HRS to more realistically evaluate the risks posed by radioactive waste constituents. These modifications significantly increase the applicability of the HRS to Department of Energy (DOE) waste disposal facilities. To provide DOE with a better management tool for prioritizing funding allocations for further site investigations and possible remediations, Pacific Northwest Laboratory is developing a more objective, scientifically based, risk assessment methodology called the Remedial Action Priority System (RAPS). This methodology will be developed using empirically, analytically, and semianalytically based mathematical algorithms to predict the potential for contaminant migration from a site to receptors of concern using pathways analyses. Four major pathways for contaminant migration will be considered in the RAPS methodology: groundwater, overland, surface water, and atmospheric. Using the predictions of contaminant transport, simplified exposure assessments will be performed for receptors of interest. The risks associated with the sites will then be calculated relative to other sites for each pathway and for all pathways together. The RAPS methodology will require minimum user knowledge of risk assessment and the least possible amount of input data. To maximize the utility of the system within DOE and its field offices, RAPS is being designed to operate on a personal computer. 17 references, 3 figures, 1 table.

47302 (CONF-841187—Vol.1, pp 143-153) **Allowable residual contamination levels for decommissioning. Part 1. A description of the method.** Napier, B.A.; Kennedy, W.E. Jr. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

This paper contains a description of the methods used in a study sponsored by UNC Nuclear Industries to determine Allowable Residual Contamination Levels (ARCL) for decommissioning facilities in the 100 Areas of the Hanford Site. The ARCL method is based on a scenario/exposure-pathway analysis and compliance with an annual dose limit for three specific modes of future use of the land and facilities. These modes of use are restricted, controlled, and unrestricted. The information on ARCL values for restricted and controlled use is intended to permit a full consideration of decommissioning alternatives. The analysis results in site-specific ARCL values that can be used for determining compliance with any annual dose limit selected. This flexibility permits proper consideration of field situations involving the radionuclide mixtures and physical conditions encountered. In addition, this method permits a full determination of as low as reasonably achievable (ALARA) conditions. 14 references, 2 figures.

47303 (CONF-841187—Vol.1, pp 163-196) **Site cleanup lessons learned: formerly utilized sites remedial action program (FUSRAP) Middlesex Site.** Neal, P.E. Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Middlesex Site discussed in this paper is the Middlesex Sampling Plant (MSP) property, some properties adjacent to the plant, and some vicinity properties. This site has been designated as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The steps taken during the decontamination and restoration work are described; there is also discussion of special equipment, new techniques, unexpected problems, and lessons learned which might be applicable to future remedial action tasks. The remedial actions resulted in moving the contaminated materials from the adjacent and vicinity properties to an interim stockpile area. At the stockpile area the material is protected and migration prevented under a controlled monitoring program. Determination of the final disposition of the material has not been made. 33 figures.

47304 (CONF-841187—Vol.2, pp 419-435) **Saltstone: cement-based waste form for disposal of Savannah River Plant low-level radioactive salt waste.** Langton, C.A. (E.I. du Pont de Nemours & Co., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018025. Contract AC09-76SR00001.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Defense waste processing at the Savannah River Plant will include decontamination and disposal of approximately 400 million liters of waste containing $NaNO_3$, NaOH, Na_2SO_4, and $NaNO_2$. After decontamination, the salt solution is classified as low-level waste. A cement-based waste form, saltstone, has been designed for disposal of Savannah River Plant low-level radioactive salt waste. Bulk properties of this material have been tailored with respect to salt leach rate, permeability, and compressive strength. Microstructure and mineralogy of leached and unleached specimens were characterized by SEM and x-ray diffraction analyses. The disposal system for the DWPF salt waste includes reconstitution of the crystallized salt as a solution containing 32 wt % solids. This solution will be decontaminated to remove ^{137}Cs and ^{90}Sr and then stabilized in a cement-based waste form. Laboratory and field tests indicate that this stabilization process greatly reduces the mobility of all of the waste constitutents in the surface and near surface environment. Engineered trenches for subsurface burial of the saltstone have been designed to ensure compatibility between the waste form and the environment. The total disposal system, saltstone-trench-surrounding soil, has been designed to contain radionuclides, Cr, and Hg by both physical encapsulation and chemical fixation mechanisms. Physical encapsulation of the salts is the mechanism employed for controlling N and OH releases. In this way, final disposal of the SRP low-level waste can be achieved and the quality of the ground water at the perimeter of the disposal site meets EPA drinking water standards.

47305 **(CONF-860820—4) Demonstration of the iodine and NO/sub x/ removal systems in the Oak Ridge National Laboratory (ORNL) Integrated Equipment Test (IET) facility** . Jubin, R.T.; Lewis, B.E. (Oak Ridge National Lab., TN (USA). Fuel Recycle Div.). 1986. Contract AC05-84OR21400. 34p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014233.

From 19. DOE/NRC nuclear air cleaning conference; Seattle, WA, USA (17 Aug 1986).

The overall iodine removal performance of the condensers during phase-two experiments was good (i.e., very small amounts of iodine were recycled), with removal efficiency for both condensers ranging from 0.35 to 6.29%. The removal efficiency for the first condenser ranged from 0.03 to 5.78%, and the second condenser, from 0.02 to 3.42%. In all the cases studied, the overall iodine removal efficiency appeared to be smallest, with the first condenser operating near 50°C. While the 50°C operating temperature is not necessarily the optimum temperature, the data appear to indicate that the optimum is bounded by 50 and 70°C. Phase three of the Integrated Equipment Test dissolver off-gas (DOG) system tests verified the operation of the dual condensers and the NO/sub x/ scrubber column under a variety of operating conditions. The removal efficiencies of the condensers were higher than anticipated, generally ~20% in these tests. The scrubber provided an NO/sub x/ effluent of ~0.4 to 1.0% during the entire campaign, which is consistent with the acceptable NO/sub x/ levels in the off-gas to Iodox. In addition, this 0.4-to-1.0% NO/sub x/ level in the scrubber effluent confirms the BRET design decision to omit the NO/sub x/ scrubber in a system with a DOG NO/sub x/ concentration of ~1.0%.

47306 **(CONF-8609117—1) Subsurface disposal of liquid low-level radioactive wastes at Oak Ridge, Tennessee.** Stow, S.H.; Haase, C.S. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 24p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013396.

From 19. congress of the International Association of Hydrogeologists; Karlovy Vary, Czechoslovakia (8 Sep 1986).

At Oak Ridge National Laboratory (ORNL) subsurface injection has been used to dispose of low-level liquid nuclear waste for the last two decades. The process consists of mixing liquid waste with cement and other additives to form a slurry that is injected under pressure through a cased well into a low-permeability shale at a depth of 300 m (1000 ft). The slurry spreads from the injection well along bedding plane fractures and forms solid grout sheets of up to 200 m (660 ft) in radius. Using this process, ORNL has disposed of over 1.5 x 10^6 Ci of activity; the principal nuclides are ^{90}Sr and ^{137}Cs. In 1982, a new injection facility was put into operation. Each injection, which lasts some two days, results in the emplacement of approximately 750,000 l (180,000 gal) of slurry. Disposal cost per liter is approximately $0.30, including capital costs of the facility. This subsurface disposal process is fundamentally different from other operations. Wastes are injected into a low-permeability aquitard, and the process is designed to isolate nuclides, preventing dispersion in groundwaters. The porosity into which wastes are injected is created by hydraulically fracturing the host formation along bedding planes. The site is in the structurally complex Valley and Ridge Province. The stratigraphy consists of lower Paleozoic rocks. Investigations are under way to determine the long-term hydrologic isolation of the injection zone and the geochemical impact of saline groundwater on nuclide mobility. Injections are monitored by gamma-ray logging of cased observation wells to determine grout sheet orientation after an injection. Recent monitoring work has involved the use of tiltmeters, surface uplift surveys, and seismic arrays. 26 refs., 7 figs.

47307 **(DOE/RW—0038) Information Services Directory.** (USDOE Office of Civilian Radioactive Waste Management, Washington, DC). Aug 1986. 23p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014823.

The Information Services Directory is intended to facilitate participation by states, affected Indian tribes and the public in the Civilian Radioactive Waste Management Program. The Directory is produced by the Information Services Division of the OCRWM's Office of Policy and Outreach and will be updated periodically. It is a reference document that identifies the sources of available program information.

47308 **(DP—1722) Radioactive waste spill and cleanup on storage tank at the Savannah River Plant.** Boore, W.G.; McNatt, F.G.; Ryland, R.K.; Scaggs, R.A.; Strother, E.D.; Wilson, R.W. (SEE CODE- 9520932 Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Mar 1986. Contract AC09-76SR00001. 110p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014331.

This report was prepared for historical purpose to document events associated with a radioactive spill and subsequent cleanup efforts at the Savannah River Plant. On December 29, 1983, approximately 100 gallons of liquid radioactive waste, containing an estimated 200-600 curies of cesium-137, leaked from a flushwater line onto the top of the Savannah River Plant's Tank 13 in H-area. The highest measured radiation rate was 100 R/hr at 12 inches from the evaporator feed pump riser. The leak was caused by a series of events involving inadequate heat tracing on a flushwater line, failure of a gasket in 7°F weather, failure of personnel to follow a procedure, and leakage across a gate valve seat. Some of the leaked solution migrated into storm water ditches during rain, and a total of 237 millicuries migrated to a nearby stream over several months. However, no significant increase in the cesium-137 concentration occurred in the Savannah River or in the groundwater under the impacted area. Cleanup, costing 3.7 million dollars, took place over the following eighteen months. Cleanup involved water flushing, chemical flushing and mechanical removal of a portion of the concrete tank-top surface, followed by excavation of 1383 cubic yards of soil surrounding the tank. Stringent and effective radiological controls, including development of remote decontamination methods, allowed the cleanup to be accomplished with a total radiation dose to personnel of 58 rems. New safeguards were built into the system to protect against spills and to provide greater assurance of spill containment. Lead sheeting and a 4- to 6-inch-thick concrete overpour were bonded over the remaining contaminated concrete to reduce the radiation levels to less than 20 mR/hr at 3 feet. The Tank 13 evaporator feed system resumed operation in June 1985. 3 refs., 42 figs., 2 tabs.

47309 **(DPST—84-537) F and H Area Effluent Treatment Facility (F/H ETF): ultrafiltration and hyperfiltration systems testing at Carre, Inc. with simulated F and H area effluents.** Ryan, J.P. (SEE CODE- 9520932 Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 23 May 1984. Contract AC09-76SR00001. 69p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86011832.

The F and H Area Effluent Treatment Facility is essentially a four-stage process that will decontaminate the waste water that is currently being discharged to seepage basins in the Separations Areas. The stages include pretreatment, reverse osmosis, ion exchange, and evaporation. A series of tests were performed at Carre, Inc. (Seneca, SC) from March 5 through March 13, to determine the usefulness of ultrafiltration (UF) in the pretreatment stage of the ETF. The results of that testing program indicate that UF would be an excellent means of removing entrained activity from the 200 Area process effluents. Hyperfiltration (HF) was also tested as a means of providing an improved concentration factor from the reverse osmosis stage. The results show that the membranes that were tested would not reject salt well enough at high salt concentrations to be useful in the final reverse osmosis stage. However, there are several membranes which are commercially available that would provide the needed rejection if they could be applied (dynamically) on the Carre support structure. This avenue is still being explored, as theoretically, it could eliminate the need for the F/H ETF evaporator.

47310 **(EUR—9844) Exploitation of the FLK-60 slagging incinerator for different alpha waste streams and study of the feasibility of medium-level alpha-beta-gamma waste incineration in FLK-60.** Van de Voorde, N.; Taeymans, A.; Hennart, D.; Balleux, W.; Geenen, G.; Gijbels, J. (Commission of the European Communities, Luxembourg). 1985. 51p. NTIS (US Sales Only), PC A04/MF A01. File Number DE86750856.

The FLK-60 high temperature slagging incinerator and its peripherals were developed by SCK/CEN with the help of the Commission of the European Communities in the framework of contract No. EUR-017-76-7 WAS-B. This second contract, which covered the period between October 1980 and December 1982, aimed at gaining exploitation experience by running the FLK-60 installation with beta-gamma radioactive waste in semi-industrial conditions. At the end of those 27 months, the system was ready for exploitation in alpha-conditions with plutonium-containing materials. This report describes the various plant parameters during the 25 runs carried out in the framework of this contract and the results of characterization tests carried out on the final product and the secondary waste streams. In the meantime, typical operation balances are computed.

47311 **(FLPU—84-6) Hydrochemistry of the groundwater flow systems in the Harwell region.** Alexander, J. (British Geological Survey, Keyworth (UK). Fluid Processes Research Group). Dec 1984. 49p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703210.

A comprehensive range of geochemical and isotopic parameters were analysed in the groundwater samples taken from the high permeability formations in the Harwell region. These analyses were undertaken as part of a hydro-chemical validation of groundwater circulation patterns derived from potentiometric data. Hydro-chemical investigations were concentrated upon the Corallian and Great Oolite formations since these respectively overlie and underlie the Oxford Clay.

47312 **(FLPU—84-8) Geochemical constraints on the microbial contamination of a hypothetical UK deep geological repository.** West, J.M.; Hooker, P.J.; McKinley, I.G. (British Geological Survey, Keyworth (UK). Fluid Processes Research Group; Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)). Aug 1984. 16p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703211.

In this report some simple calculations are carried out to examine the constraints on the maximum effect of microbial contamination of a high level waste repository. The approach used is conservative as total inventories of carbon and other nutrients are calculated without regard to the inaccessibility to organisms and kinetic constraints on the concentration of diffuse sources on to organisms. From these calculations it appears that the main limiting factor would be 'available' carbon and, as long as carbonates within the bentonite backfill cannot be used, this should limit maximum dry biomass to 3 x 10^3g within a 3.3 m^3 backfill region. Although the total potential free energy available from canister corrosion is large, the rate of utilisation of such energy will be subject to, as yet, poorly defined kinetic constraints. An important finding is that if oxic corrosion is the only source of energy for microbes then canister corrosion by this method would be negligible. It is concluded that the possibility of significant microbial contamination cannot be excluded. Potentially important consequences would include radionuclide transport on mobile organisms, particularly of poorly retarded species such as Tc and Np, and enhanced solubility of particular nuclides when complexed with microbial organic by-products. The subject is discussed further.

47313 **(GSF—42/85) Radiation protection measurements and environmental monitoring within the area of the Asse mine shaft. Annual report 1984.** Mueller-Lyda, I.; Meyer, H.; Stippler, R. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Braunschweig (Germany, F.R.). Inst. fuer Tieflagerung). Nov 1985. 41p. (In German). (GSF-T—225). NTIS (US Sales Only), PC A03/MF A01. File Number DE86752607.

This report presents results of continuous routine measurements carried out as in previous years, in accordance with the Radiation Protection Ordinance, for personnel monitoring and estimation of local dose, local dose rate and airborne radioactivity in the shaft. There was no value measured that exceeded the maximum permissible dose to personnel or activity, as defined for occupational radiation exposure. In the gaseous effluents of the Asse salt mine, the nuclides H-3, C-14, Pb-210 and the short-lived daughters of Rn-222 and Rn-220 were detected. The concentrations determined from the mean annual release for the shaft environment partly were below the mean natural concentrations of the above nuclides. The radiation dose at the least favourable place in the environment was far below the dose limits definered by the Radiation Protection Ordinance.

47314 **(INIS-GB—7) Radioactive waste management. The national strategy.** (Department of the Environment, London (UK)). Jul 1984. 27p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703200.

The purpose of this document is to set out the Government's current strategy for the long term in the management of radioactive wastes. It takes account of the latest developments, and will be subject to review in the light of future developments and studies. The subject is discussed under the headings: what are radioactive wastes; who is responsible; what monitoring takes place; disposal as the objective; low-level wastes; intermediate-level wastes; discharges from Sellafield; heat generating wastes; how will waste management systems and procedures be assessed; how much more waste is there going to be in future; conclusion.

47315 **(LA—10732-MS) Gas generation and migration studies involving recently generated ^{238}Pu-contaminated waste for the TRU Waste Sampling Program.** Zerwekh, A.; Warren, J.L. (Los Alamos National Lab., NM (USA)). Jul 1986. Contract W-7405-ENG-36. 52p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014886.

This study is part of the multicontractor TRU Waste Sampling Program. Radiolytically generated gases were vented through a filtering device to determine its effectiveness in maintaining hydrogen concentrations within acceptably safe levels. In the second part of the study measurements were made to determine the ability of these gases, particularly hydrogen, to migrate through a sealed rigid polyethylene drum liner. Void volumes in these drums were found to be generally in excess of 90%. The carbon composite filter was found to satisfactorily vent hydrogen up to moderately high levels of alpha activity in the waste substrate. The sealed 90-mil liner was found to inhibit, but not prevent, the migration of hydrogen and other radiolytically generated gases.

47316 **(ORNL/TM—10002) Characterization of the homogeneous reactor experiment No. 2 (HRE) impoundment.** Stansfield, R.G.; Francis, C.W. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 113p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014420.

A characterization study was conducted on a radioactive waste impoundment for the Homogeneous Reactor Experiment No. 2 at the Oak Ridge National Laboratory, to provide information necessary for its proper disposition. The impoundment received low-level radioactive wastes from 1957 until 1963. In 1970, the pond was backfilled with clay soil and the impoundment capped with asphaltic concrete, but no wastes were removed. The mixed soil fill and sediment, approximately 4.8 m deep, was sampled using soil boring methods. The samples were analyzed to determine if the material would classify as a hazardous waste under regulatory definitions promulgated in accordance with the Resource Conservation and Recovery Act (RCRA). If the soil and sediment mixture contained RCRA-defined hazardous waste, it would be subject to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Chemical analyses indicate that the sampled material does not contain hazardous chemical constituents above the levels permitted by RCRA regulations. The sediment was found to contain an estimated radioactivity inventory of approximately 2700 GBq (70 Ci) of ^{90}Sr and 600 GBq (16 Ci) of ^{137}Cs.

47317 **(PB—86-210531/XAB) Radiological measurement at the Maxey Flats radioactive waste burial site - 1974 to 1975.** Montgomery, D.M.; Kolde, H.E.; Blanchard, R.L. (Office of Radiation Programs, Washington, DC (USA)). Jan 1977. 109p. (EPA/520/5—76/020). NTIS, PC A06/MF A01.

The report discusses radiological measurements made by the Radiochemistry and Nuclear Engineering Branch, Cincinnati, at the request of the ORP Technology Assessment Division in support of EPA's program to obtain data on the principles and processes of land burial and the actual impact on the environment of presently operating commercial burial facilities. The information obtained indicates that the quantities of radioactivity detected outside the burial trenches are so low that they do not appear to be a significant hazard to the environment or to public health in the Maxey Flats area, at the present time. However, the potential long-range impact of these contaminants is not known.

47318 **(PNL—5830) Composition of high fission product wastes resulting from future reprocessing of commercial nuclear fuels.** Swanson, J.L. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 40p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014820.

Pacific Northwest Laboratory studies, aimed at defining appropriate glass compositions for future disposal of high-level wastes, have developed composition ranges for the waste that will likely result during reprocessing of Light Water Reactor (LWR) and Liquid Metal Reactor (LMR) fuels. The purpose of these studies was to provide baseline waste characterizations for possible future commercial high-level waste so that waste immobilization technologies (e.g., vitrification) can be studied. Ranges in waste composition are emphasized because the waste will vary with time as different fuels are reprocessed, because choice of process chemicals is nuclear, and because fuel burnups will vary. Consequently, composition ranges are based on trends in fuel reprocessing procedures and on achievable burnups in operating reactors. In addition to the fission product and actinide elements, which are the primary hazardous materials in the waste, likely composition ranges are given for inert elements that may be present in the waste. These other elements may be present because of being present in the fuel, because of being added as process chemical during reprocessing, because of being added during equipment decontamination, or because of corrosion of plant equipment and/or fuel element cladding. This report includes a discussion of the chemicals added in variation of the PUREX process, which is likely to remain the favored

reprocessing technique for commercial nuclear fuels. Consideration is also given to a pyrochemical process proposed for the reprocessing of some LMR fuels.

47319 **(PNL—5919) Demonstration of an approach to waste form qualification through simulation of liquid-fed ceramic melter process operations.** Reimus, P.W.; Kuhn, W.L.; Peters, R.D.; Pulsipher, B.A. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 103p. NTIS, PC A06/MF A01; GPO Dep. File Number DE86014819.

During fiscal year 1982, the US Department of Energy (DOE) assigned responsibility for managing civilian nuclear waste treatment programs in the United States to the Nuclear Waste Treatment Program (NWTP) at the Pacific Northwest Laboratory (PNL). One of the principal objectives of this program is to establish relationships between vitrification process control and glass quality. Users of the liquid-fed ceramic melter (LFCM) process will need such relationships in order to establish acceptance of vitrified high-level nuclear waste at a licensed federal repository without resorting to destructive examination of the canisters. The objective is to be able to supply a regulatory agency with an estimate of the composition, durability, and integrity of the glass in each waste glass canister produced from an LFCM process simply by examining the process data collected during the operation of the LFCM. The work described here will continue through FY-1987 and culminate in a final report on the ability to control and monitor an LFCM process through sampling and process control charting of the LFCM feed system.

47320 **(SAAS—332) Selecting metallic canister materials for disposal of high-level radioactive wastes in rock salt formations.** Mueller, E.; Riedel, H. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). 1985. 42p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE86703212.

Data published up to 1981 on the corrosion behaviour of metallic materials in contact with rock salt or brine make it seem probable that Ti-base alloys are most promising candidates for canister materials for the disposal of high-level radioactive wastes in a salt deposit. This assumption is contrasted with own test results demonstrating that Ti-0.2% Pd, like austenitic stainless steel, is susceptible to localized corrosion when exposed to rock salt at temperatures between 350 to 430°C. On the other hand, no significant corrosion phenomena have been observed in specimens of Type-C45 carbon steel under these conditions. 28 refs.

47321 **Nuclear Waste Policy Act of 1982: progress and problems. Hearings before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, House of Representatives, Ninety-Ninth Congress, First Session, November 6, 7, 1985.** Washington, DC; Government Printing Office (1986). 672p.

Representatives of the nuclear industry, nuclear waste programs, local governments, and state and federal waste agencies testified at a two-day hearing on the status of the Nuclear Waste Policy Act (NWPA) of 1982 implementation. Witnesses were asked to explore five major issues: scheduling problems, the validity of complaints about cooperative aspects, the political impact of the Monitored Retrievable Storage (MRS) facility, the adequacy of the plan, and the need for legislative revisions. Witnesses spoke of public concerns about the transport of radioactive wastes and the technological problems of storage. A report from the Oak Ridge, Tennessee, MRS Task Force evaluated DOE's MRS facility proposal for the area and concluded that a safe facility is possible if its regulatory and economic recommendations are followed. Two appendices with additional materials and responses submitted for the record follow the testimony of the 11 witnesses.

47322 **Disposal of high-level nuclear waste. Hearing before the Committee on Environment and Public Works, United States Senate, Ninety-Ninth Congress, First Session, October 30, 1985.** Washington, DC; Government Printing Office (1986). 435p.

Representatives of the Nuclear Regulatory Commission (NRC), the Environmental Protection Agency, state public service commissions and waste offices, and the general public testified at a hearing on the siting of siting waste disposal facilities. At issue was the possibility of placing such a site in Vermont because of its geographic location, its extreme winter climate, and its unsuitable geology. Concerns at public hearings in Vermont and elsewhere emphasized the need to review the current Nuclear Waste Policy Act to see that legislative intent has been followed and whether its focus on political rather than technological solutions is sound. Speakers focused on health and environmental issues in the siting question. NRC Chairman Palladino described how the DOE has performed its mission plan under the program. Material submitted for the record follows the testimony of 15 witnesses.

47323 **Analytical methods and laboratory facility for the Defense Waste Processing Facility.** Coleman, C.J.; Dewberry, R.A.; Letcho, A.J.; Denard, C.D. (Savannah River Lab., Aiken, SC). pp 337-343 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC09-76SR00001.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

This paper describes the analytical methods, instruments, and laboratory that will support vitrification of defense waste. The Defense Waste Processing Facility (DWPF) is now being constructed at Savannah River Plant (SRP). Beginning in 1989, SRP high-level defense waste will be immobilized in borosilicate glass for disposal in a federal repository. The DWPF will contain an analytical laboratory for performing process control analyses. Additional analyses will be performed for process history and process diagnostics. The DWPF analytical facility will consist of a large shielded sampling cell, three shielded analytical cells, a laboratory for instrumental analysis and chemical separations, and a counting room. Special instrumentation is being designed for use in the analytical cells, including microwave drying/dissolution apparatus, and remote pipetting devices. The instrumentation laboratory will contain inductively coupled plasma, atomic absorption, Moessbauer spectrometers, a carbon analyzer, and ion chromatography equipment. Counting equipment will include intrinsic germanium detectors, scintillation counters, Phoswich alpha, beta, gamma detectors, and a low-energy photon detector.

47324 **Electrical service and controls for joule heating of a nuclear waste experimental glass melter.** Erickson, C.J.; Haideri, A.Q. (E.I. du Pont de Nemours & Co., Wilmington, DE). pp 1-6 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—).

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

Safe storage of highly radioactive waste is a problem facing the nuclear industry. The best technique developed to date, for long-term storage, is to encapsulate the waste into borosilicate glass. Ceramic lined electric glass melters have been demonstrated as systems for nuclear waste vitrification. The Department of Energy recently authorized the installation of an experimental glass melter at the Savannah River nuclear facility. Nonradioactive slurry, with the same chemical/physical properties as existing radioactive waste slurry was mixed with glass frit, melted, poured into containers, and allowed to solidify. Initially, the slurry was calcined (dried) before mixing with the frit and being dropped into the melter. Later, the drying step was eliminated; the liquid slurry and glass frit are fed directly into the melter. Vaporizing the water adds to the heating requirements in the melter. The glass is poured into cannisters by either tilting the melter or drawing a vacuum at the pour spout. This melter concept is a prototype for a melter to be installed in a "canyon" building. The "canyon" is an isolated building with provision for radioactive confinement. No personnel can be in the building, so all operations and maintenance are remotely performed. Remote operation is made possible by comprehensive instrumentation and closed-circuit television viewing.

0530 Environmental Aspects

REFER ALSO TO CITATION(S) 47303, 47316, 48677, 48699, 48700, 48701, 48938

47325 (CONF-841187—Vol.1, pp 1-7) **Opening address to conference on environmental protection.** Tiller, R.E. Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

47326 (CONF-841187—Vol.1, pp 59-73) **Problems of risk balancing for regulating environmental hazards.** Gilbert, T.L. (Argonne National Lab., IL). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Rational regulation of environmental hazards may be based on the implicit underlying principles that government actions should enhance the average quality of life for those governed and maintain some degree of equity in the distribution of benefits, costs, and risks. Issues arising from these principles have practical implications for risk management policy in general and for the development and application of radiological protection criteria in particular. One of the issues is the appropriate distribution of expenditures for regulating different risks. The total resources available for risk regulation are finite; hence, minimizing the total risk subject to this constraint is an appropriate strategy for optimum risk management. Using a simple model, it is shown that this strategy leads to a distribution of expenditures between different risks such that a greater fraction is allocated to a risk with a higher cost of mitigation or control but the allocation is limited in such a manner that the fractional contribution of that risk to the total risk is also higher. The effect of deviating from this strategy is examined. It is shown that reducing a single risk of concern below the optimum value by a factor 1/F can increase the total risk by about F times the risk of concern. Taking into account the large uncertainties in risk assessment for establishing radiological protection criteria, it is argued that an optimum strategy for remedial action should (1) set basic risk limits as high as reasonable; (2) use realistic, case-specific data and analyses in deriving allowable residual contamination levels from basic risk limits; and (3) implement a policy of reducing residual contamination to levels that are as low as reasonably achievable (ALARA) within the constraints imposed by optimum resource allocation. 10 references, 1 figure.

47327 (CONF-841187—Vol.1, pp 109-118) **Radiological protection guidelines for the Formerly Utilized Sites Remedial Action Program and remote Surplus Facilities Management Program.** Gilbert, T.L. (Argonne National Lab., IL). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The need for a definitive basis for radiological guidelines and criteria for FUSRAP became apparent by 1981 and led ORO to sponsor a joint ANL/BNI/LANL/ORO effort under the chairmanship of Wayne Hansen (LANL) that resulted in a final FUSRAP radiological guidelines document in March 1983. A separate effort to develop guidelines for remedial action criteria for SFMP was in progress at PNL. The need to coordinate both efforts with impending revisions of DOE Radiological Protection Standards and impending new developments in EPA and NRC Radiological Protection Standards led to convening of the first DOE Workshop on Remedial Action Criteria in Gaithersburg, Maryland, in February 1984, followed by a second workshop in June 1984 at ANL. The major decisions were to base the criteria on dosimetry models and basic limits currently recommended by the International Commission on Radiological Protection, to emphasize the development and use of site-specific rather than generic guidelines and criteria for residual radionuclide concentrations in the ground, and to prepare a manual to accompany the guidelines that would present procedures and tables for deriving site-specific soil guidelines and criteria for the remedial action programs. A joint ANL/LANL/ORNL/PNL effort to prepare a definitive set of guidelines and a manual has been initiated. The scope, status, and current plans for this effort, and some of the key issues, are presented. 10 references, 1 table.

47328 (CONF-841187—Vol.1, pp 119-141) **Review of standards and guidelines pertinent to DOE's Remedial Action programs.** Soldat, J.K.; Denham, D.H. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A number of radiological standards, guidelines, and dose criteria have been promulgated that may be relevant to the Department of Energy's (DOE) Remedial Action programs. Some of these are being applied to remedial actions undertaken by DOE to ensure that health and safety aspects are adequately addressed. Pacific Northwest Laboratory staff reviewed existing and proposed environmental radiological standards and criteria for their applicability to DOE's Remedial Action Programs. National and international environmental standards and criteria, and studies conducted by other DOE contractors were reviewed. The review indicated that there is a lack of uniformity between the dose guidelines developed by the various agencies. A uniform dose standard is needed for D&D, at least as an upper limit with application of the ALARA philosophy. 33 references, 5 tables.

47329 (CONF-841187—Vol.1, pp 154-162) **Allowable residual contamination levels for decommissioning. Part 2. A summary of example results.** Kennedy, W.E. Jr.; Napier, B.A. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

This paper contains a description of the results of a study sponsored by UNC Nuclear Industries to determine Allowable Residual Contamination Levels (ARCL) for decommissioning facilities in the 100 Areas of the Hanford Site. ARCL results are presented both for surface contamination remaining in facilities (in dpm/100 cm^2) and for unconfined surface and confined subsurface soil conditions (in pCi/g). Two confined soil conditions are considered: contamination at depths between 1 and 4 m, and contamination at depths greater than or equal to 5 m. A set of worksheets are discussed for modifying the ARCL values to accommodate changes in the radionuclide mixture or concentrations, to consider the impacts of radioactive decay, and to predict instrument responses. Finally, a comparison is made between the unrestricted release ARCL values for the 100 Area facilities and existing decommissioning and land disposal regulations. For surface contamination, the comparison shows good agreement for a selected annual dose limit. For soil contamination, the comparison shows good agreement if reasonable modification factors are applied to account for the differences in modeling soil contamination and licensed low-level waste. 6 references, 1 figures, 4 tables.

47330 (CONF-841187—Vol.1, pp 207-220) **Environmental protection in the UMTRA PROJECT.** Meyer, H.R.; Skinner, D.; Coffman, J.; Arthur, J. (Dept. of Energy, Albuquerque, NM). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Planning and implementation of a comprehensive environmental protection system within the Uranium Mill Tailings Remedial Action (UMTRA) Project continues to be a complex process. Compliance is necessary with a large set of federal, state and Indian tribal regulations and requirements, and with public requests. Because the project covers sites in great variety of climates and terrain, and includes both heavily populated and virtually unpopulated locations, environmental assessment is further complicated. Monitoring of initial remedial action at the Canonsburg, Pennsylvania tailings site indicates that compliance with applicable DOE and NRC regulations and standards for offsite radon and daughters, particular radionuclides in air and waterborne radio-nuclides will be met during cleanup operations. However, as greater quantities of uranium tailings materials are exposed and transported at Canonsburg, a careful link between environmental monitoring and control of releases will be required to ensure compliance. Morrison-Knudsen Corporation, assisted by Chem-Nuclear Systems, Inc., is responsible to the US DOE for performing engineering design, remedial

action, and radiological activities at UMTRA sites, and at many UMTRA vicinity properties. This paper focuses on the current implementation of applicable standards and requirements, and procedures and devices currently being employed to operate the environmental monitoring program at UMTRA sites, and summaries of monitoring information acquired recently at the first site. 8 figures.

47331 (CONF-841187—Vol.1, pp 221-229) **Development of environmental monitoring programs at four Formerly Utilized Sites Remedial Action Program (FUSRAP) sites.** Kuhaida, A.J. Jr.; Liedle, J.M.; Liedle, S.D.; Cotten, P.R. (Bechtel National, Inc., Oak Ridge, TN). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Environmental monitoring plans were developed for four FUSRAP sites designated for research and development funding under the 1984 Energy and Water Development Appropriations Act. The sites are located in Hazelwood, Missouri; Colonie, New York; and Wayne and Maywood, New Jersey. The Hazelwood site was formerly used for drying and storing radioactive residues from uranium ore handling operations. Both the Maywood and Wayne sites processed thorium ore while the Colonie site manufactured products from depleted uranium. All four sites are located in urban areas. Surface water hydrology is typically complex with indistinct drainageways and subsurface conduits. Groundwater is a major concern for potential contamination. The primary elements of each environmental monitoring plan, as outlined in Chapter III of Department of Energy (DOE) Order 5484.1, require scheduled monitoring for external radiation and radiological monitoring in air, surface water, sediment, and groundwater. The extent of each monitoring plan in relation to the selection of suitable monitoring methods, parameters, and sample locations was based on factors including historical data describing site operations; radiological and nonradiological waste generation; local, state, and federal governmental concerns; and the extent and the type of utilization of affected offsite air, land, and water. The monitoring programs include measuring radon and thoron gas levels in the air. Surface water and sediment will be sampled for radionuclides characteristic of past activities. Monitoring wells will be installed and used to evaluate the presence of radionuclides in groundwater. External gamma radiation will be monitored for changes in radiation exposure rates. 11 references, 1 figure, 1 table.

47332 (CONF-841187—Vol.1, pp 231-245) **Outdoor radon monitoring at DOE remedial action sites.** Rudy, C.R. Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC04-76DP00053.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Department of Energy is responsible for the disposal of tailings materials from uranium processing activities formerly performed for the US government. One of the primary radiological hazards of tailings material is the radon gas produced by radium and emitted into the atmosphere. The purpose of the monitoring is to determine to what extent radon concentrations in areas neighboring the processing sites have increased and to measure the success of remedial action in reducing outdoor radon concentrations. Currently, Mound is performing radon monitoring near UMTRA sites at Canonsburg, PA, Salt Lake city, UT, and Shiprock, NM, and near FUSRAP sites at Middlesex, NJ and Lewiston, NY (Niagara Falls Storage Site). Radon monitoring networks of up to 40 monitoring locations are emplaced at the fencelines of these sites and at distances up to 5 km from each site. The monitors are Passive Environmental Radon Monitors (PERMs) and film detectors. With these devices, background radon levels and isopleths of radon concentrations centered on the tailings piles can be determined. This information provides valuable background data for DOE contractor health physics personnel, government officials, and concerned citizens. Prior to remedial action, radon concentrations at the fenceline exceed the DOE guideline limit of 3.0 pCi/liter (yearly average) at some sites; however, radon concentrations are lower than the DOE guidelines at nearly all off-site locations. Generally, radon concentrations drop off to background levels within 2 kilometers of the site. 2 references, 8 figures, 1 table.

47333 (CONF-841187—Vol.1, pp 289-297) **Prevention of biological transport of radioactivity in the Hanford 200 areas.** Conklin, A.W.; Wheeler, R.E.; Elder, R.E.; Osborne, W.L. (Rockwell Hanford Operations, Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Environmental surveillance in the Hanford 200 Areas is conducted, in part, to determine the potential impact on the environment following biological intrusion into, and transport from, radioactive waste containment systems; and to initiate mitigative action to decontaminate the environment, eliminate the source term, and/or prevent future intrusion. Biological transport incidents have included assimilation by Russian thistle via physiological plant processes and subsequent dispersal by winds, bird access into exposed contamination, and animals burrowing into radioactive waste disposal sites. Rockwell Hanford Operations, through mitigative actions and continued surveillance, has made significant progress in eliminating, or better isolating, source terms, thus preventing such incidents from recurring. Approximately 60% of source-term acreage requiring stabilization or decontamination has been completed. 5 references, 3 tables.

47334 (CONF-841187—Vol.1, pp 335-339) **DOE's Assurance Program for Remedial Action (APRA).** Denham, D.H.; Stenner, R.D.; Welty, C.G. Jr.; Needels, T.S. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The US Department of Energy's (DOE) Office of Operational Safety (OOS) is presently developing and implementing the Assurance Program for Remedial Action (APRA) to overview DOE's Remedial Action programs. APRA's objective is to ensure the adequacy of environmental, safety and health (ES & H) protection practices within the four DOE Remedial Action programs: Grand Junction Remedial Action Program (GJRAP), Uranium Mill Tailings Remedial Action Program (UMTRAP), Formerly Utilized Sites Remedial Action Program (FUSRAP), and Surplus Facilities Management Program (SFMP). APRA encompasses all ES & H practices of DOE and its contractors/subcontractors within the four Remedial Action programs. Specific activities of APRA include document reviews, selected site visits, and program office appraisals. Technical support and assistance to OOS is being provided by APRA contractors in the evaluation of radiological standards and criteria, quality assurance measures, radiation measurements, and risk assessment practices. This paper provides an overview of these activities and discusses program to date, including the roles of OOS and the respective contractors. The contractors involved in providing technical support and assistance to OOS are Aerospace Corporation, Oak Ridge Associated Universities, and Pacific Northwest Laboratory.

47335 (CONF-841187—Vol.1, pp 341-351) **Use of a simplified pathways model to improve the environmental surveillance program at the radioactive waste management complex of the Idaho National Engineering Laboratory (INEL).** Case, M.J.; Rope, S.K. (EG & G Idaho, Inc., Idaho Falls). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Systems analysis, including a simple pathways model based on first-order kinetics, is a useful way to design or improve environmental monitoring networks. This method allows investigators and administrators to consider interactions that may be occurring in the system and provides guidance in determining the need to collect data on various system components and processes. A simplified pathways model of radionuclide movement from low-level waste and transuranic waste buried at the Radioactive Waste Management Complex was developed (1) to identify critical pathways that should be monitored and (2) to identify key input parameters that need investigation by special studies. The model was modified from the Savannah River Laboratory DOSTOMAN code. Site-specific data were used in the model, if available. Physical and biological pathways include airborne and waterborne transport of surface soil,

subsurface migration to the aquifer, waste container degradation, plant uptake, small mammal burrowing, and a few simplified food chain pathways. The model was run using a set of radionuclides determined to be significant in terms of relative hazard. Critical transport pathways which should be monitored were selected based on relative influence on model results. Key input parameters were identified for possible special studies by evaluating the sensitivity of model response to the parameters used to define transport pathways. A description of the approaches used and the guidance recommended to improve the environmental surveillance program are presented in this paper. 5 references, 1 figure, 2 tables.

47336 (CONF-841187—Vol.2, pp 541-553) **Investigation of the subsurface environment at the Idaho National Engineering Laboratory Radioactive Waste Management Complex.** Russell, B.F.; Mizell, S.A.; Hull, L.C.; Smith, T.H.; Lewis, B.D.; Barraclough, J.T.; Humphrey, T.G. (Idaho National Engineering Lab., Idaho Falls). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC07-76ID01570.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A comprehensive, 10-year plan to investigate radionuclide migration in the subsurface at the Radioactive Waste Management Complex (RWMC) has been prepared and initiated (in FY-84) by EG & G Idaho, Inc., a prime contractor to the Department of Energy (DOE), and the US Geological Survey INEL Project Office. The RWMC Subsurface Investigation is designed to address two objectives set forth by the DOE Idaho Operations Office: 1) determine the extent of radionuclide migration, if any, from the buried waste, and 2) develop and calibrate a computer model to simulate long-term radionuclide migration. Low level waste and (prior to 1970) transuranic waste have been buried in the surficial sediments at the RWMC. The first burials took place in 1952. Due to the complicated disposal system, a comprehensive review of state-of-the-art vadose zone monitoring instrumentation and techniques, an analysis of conceptual migration pathways, and an evaluation of potential hazard from buried radionuclides were conducted to guide preparation of the investigation plan. The plan includes an overview of the RWMC facility, subsurface work conducted to date at the RWMC and other DOE laboratory facilities, an evaluation and selection of the methods and studies to be used, a radionuclide hazard evaluation, a cost analysis, and external peer review results. In addition, an Appendix contains the details for each method/study to be employed.

47337 (IAEA-TECDOC—362, pp 85-88) **Site-specific hydrodynamic model for the Loviisa Nuclear Power Plant area.** Jokinen, O.; Launiainen, J. (Institute of Marine Research, Helsinki, Finland; Department of Geophysics, Helsinki Univ., Finland). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

The numerical hydrodynamic model has been constructed for the Loviisa nuclear power plant area to estimate the aquatic current field and pathways of cooling water and, to simulate transfer and dispersion of radioactivity. The hydrodynamic model for calculation of current fields is a one-layer (vertically integrated equations of motion) time-dependent model with a grid size of 200 m and a calculation time step of 10 s. The model area of 21 km^2 covers the semienclosed bay (area of 15 km^2 with a mean depth of 7 m) into which the cooling water is discharged and a region of open sea off the bay. 4 figs.

47338 (LA—10768-MS) **Los Alamos low-level waste performance assessment status.** Wenzel, W.J.; Purtymun, W.D.; Dewart, J.M.; Rodgers, J.E. (comps.). (Los Alamos National Lab., NM (USA)). Jun 1986. Contract W-7405-ENG-36. 167p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE86014887.

This report reviews the documented Los Alamos studies done to assess the containment of buried hazardous wastes. Five sections logically present the environmental studies, operational source terms, transport pathways, environmental dosimetry, and computer model development and use. This review gives a general picture of the Los Alamos solid waste disposal and liquid effluent sites and is intended for technical readers with waste management and environmental science backgrounds but without a detailed familiarization with Los Alamos. The review begins with a wide perspective on environmental studies at Los Alamos. Hydrology, geology, and meteorology are described for the site and region. The ongoing Laboratory-wide environmental surveillance and waste management environmental studies are presented. The next section describes the waste disposal sites and summarizes the current source terms for these sites. Hazardous chemical wastes and liquid effluents are also addressed by describing the sites and canyons that are impacted. The review then focuses on the transport pathways addressed mainly in reports by Healy and Formerly Utilized Sites Remedial Action Program. Once the source terms and potential transport pathways are described, the dose assessment methods are addressed. Three major studies, the waste alternatives, Hansen and Rogers, and the Pantex Environmental Impact Statement, contributed to the current Los Alamos dose assessment methodology. Finally, the current Los Alamos groundwater, surface water, and environmental assessment models for these mesa top and canyon sites are described.

0540 Health And Safety

REFER ALSO TO CITATION(S) 47308

47339 (CONF-841187—Vol.2, pp 771-780) **Guide to radiological accident considerations for siting and design of DOE nonreactor nuclear facilities.** Elder, J.C.; Graf, J.M. (Los Alamos National Lab., NM). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

DOE Office of Nuclear Safety has sponsored preparation of a guidance document to aid field offices and contractors in their analyses of consequences of postulated major accidents. A summary of needs for such guidance was presented at the 4th Environmental Protection Conference in 1982. A guide will soon be issued for trial use after extensive peer review. The guide addresses the requirements of DOE Orders 5480.1A, Chapter V, and 6430.1, including the general requirement that DOE nuclear facilities be sited, designed, and operated in accordance with standards, codes, and guides consistent with those applied to comparable licensed nuclear facilities. The guide includes both philosophical and technical information in the areas of: siting guidelines doses applied to an offsite reference person; consideration also given to an onsite reference person; physical parameters, models, and assumptions to be applied when calculating doses for comparison to siting criteria; and, potential accident consequences other than radiological dose to a reference person which might affect siting and major design features of the facility, such as environmental contamination, population dose, and associated public health effects. Recommendations and/or clarifications are provided where this could be done without adding new requirements. In this regard, the guide is considered a valuable aid to the safety analyst, especially where requirements have been subject to inconsistent interpretation or where analysis methods are in transition, such as use of dose model (ICRP 2 or ICRP 30) or use of probabilistic methods of risk analysis in the siting and design of nuclear facilities.

47340 (FRNC-TH—2165) **Investigation of some physicochemical characteristics of uraniferous compounds on workplace layout.** Ansoborlo, E. (Ecole Centrale des Arts et Manufactures, 92 - Chatenay-Malabry (France)). 1983. 124p. (In French). NTIS (US Sales Only), PC A06/MF A01. File Number DE86750855.

Main uranium compounds found during ore processing and their solubility in synthetic biologic media are reviewed. Notions on dust inhalation and toxicity are recalled. Dust of UF_4 is more specially studied. Biological behavior and in vitro solubility are studied. Solubility in synthetic biological medium is the best toxicological approach of the inhalation problem. 34 references are given.

47341 **(NUREG/CR—3585-Vol.2) De Minimis waste impacts analysis methodology. IMPACTS - BRC user's guide and methodology for radioactive wastes below regulatory concern. Draft report for comment. Volume 2.** Forstom, J.M.; Goode, D.J. (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Waste Management). Jul 1986. 152p. NTIS, PC A08/MF A01 - GPO. File Number TI86901613.

This report describes the methodology and computer program used by NRC to evaluate radiological impacts associated with petitions to have specific slightly contaminated radioactive waste streams designated as "below regulatory concern." These wastes could be treated and disposed of at facilities which are not licensed for low-level radioactive waste management. The IMPACTS-BRC computer program is implemented on IBM-PC microcomputers using the FORTRAN programming language. Radiological impacts (doses) are estimated for several pathways including direct gamma radiation exposure, worker inhalation and exposure, offsite atmospheric and water releases, and intruder exposures. Annual impacts are calculated for the maximum individual, critical groups, and general population. The treatment and disposal options include onsite incineration, incineration at municipal and hazardous waste facilities, and disposal at sanitary landfills and hazardous waste landfills. Modifications to the program (from Volume 1) are primarily for microcomputer compatibility and to provide information needed to evaluate the petitions. Default environmental and facility parameters are developed representing conservative assumptions about site selection and operational procedures. In particular, the parameters of the groundwater pathway model are modified to represent more conservative assumptions than the original model (Volume 1).

47342 **(PERG-RR—13) Health risks of nuclear and coal fuel cycles in electricity generation. A critical review of comparative assessments for the United Kingdom.** Kayes, R.J.; Taylor, P.J. (Political Ecology Research Group, Oxford (UK)). Dec 1984. 97p. British Library Lending Division, Boston Spa, Wetherby, LS23 7BQ.

A report has been prepared by the Political Ecology Research Group in which the field of comparative risk assessment of electricity generation from nuclear and coal fuel cycles is critically reviewed. Section 2 gives an introduction to risk assessments and points out the limitations of the numerical assessments that are so widely quoted. Section 3 critically reviews the major study of the UK situation, the remaining minor British studies and two American studies. Section 4 examines in detail certain areas of controversy and significance that arise in the previous section. It relates the numerical values of risk derived in Section 3 to risks in other sectors of society. Section 5 considers the significance of these estimates of risk and the conclusions are presented in section 6.

0550 Regulations

REFER ALSO TO CITATION(S) 48298, 49638, 49639

47343 **(BNL—38314) Zone approaches to international safeguards of a nuclear fuel cycle.** Fishbone, L.G.; Higinbotham, W.A. (Brookhaven National Lab., Upton, NY (USA). Technical Support Organization). 1986. Contract AC02-76CH00016. 11p. (CONF-860654—40). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014130.

From 27. annual meeting of the Institute of Nuclear Materials Management; New Orleans, LA, USA (22 Jun 1986).

At present the IAEA designs its safeguards approach with regard to each type of nuclear facility so that the safeguards activities and effort are essentially the same for a given type and size of nuclear facility wherever it may be located. Conclusions regarding a state are derived by combining the results of safeguards verifications for the individual facilities within it. We have examined safeguards approaches for a state nuclear fuel cycle that take into account the existence of all of the nuclear facilities in the state. We have focussed on the fresh-fuel zone of an advanced nuclear fuel cycle, the several facilities of which use or process low-enriched uranium. At one extreme, flows and inventories would be verified at each material balance area. At the other extreme, the flows into and out of the zone and the inventory of the whole zone would be verified. The intention is to develop an approach which will make it possible to compare the technical effectiveness and the inspection effort for the facility-oriented approach, for the zone approach and for some reasonable intermediate safeguards approaches. Technical effectiveness, in these cases, means an estimate of the assurance that all nuclear material has been accounted for.

47344 **(GAT-NM—137) Characterization of process holdup material at the Portsmouth Gaseous Diffusion Plant.** Boyd, D.E.; Miller, R.R. (Goodyear Atomic Corp., Piketon, OH (USA)). 23 Jun 1986. Contract AC05-76OR00001. 9p. (CONF-860654—39). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013557.

From 27. annual meeting of the Institute of Nuclear Materials Management; New Orleans, LA, USA (22 Jun 1986).

The cascade material balance area at the Portsmouth Gaseous Diffusion Plant is characterized by continuous, large, in-process inventories of gaseous uranium hexafluoride (UF_6) and very large inputs and outputs of UF_6 over a complete range of ^{235}U enrichments. Monthly inventories are conducted to quantify the in-place material, but the inventory techniques are blind to material not in the gas phase. Material is removed from the gas phase by any one of four mechanisms: (1) freeze-outs which are the solidification of UF_6, (2) inleakage of wet air which produces solid uranium oxyfluorides, (3) consumption of uranium through UF_6 reaction with internal metal surfaces, and (4) adsorption of UF_6 on internal surfaces. This presentation describes efforts to better characterize and, where possible, to eliminate or reduce the effects of these mechanisms on material accountability. Freeze-outs and wet air deposits occur under abnormal operating conditions, and techniques are available to prevent, detect and reverse them. Consumption and adsorption occur under normal operating conditions and are more complex to manage, however, computer models have been developed to quantify monthly the net effects due to consumption and adsorption. These models have shown that consumption and adsorption effects on inventory differences are significant.

47345 **(LA—10672-C) International training course on implementation of state systems of accounting for and control of nuclear materials: proceedings.** (Los Alamos National Lab., NM (USA)). Jun 1986. Contract W-7405-ENG-36. 835p. (CONF-850680—). NTIS, PC A99/MF A01; 1; GPO Dep. File Number DE86013067.

From Advanced international training course on implementation of state systems of accounting for and control of nuclear material; Santa Fe, NM, USA (2 Jun 1985).

This report incorporates all lectures and presentations at the International Training Course on Implementation of State Systems of Accounting for and Control of Nuclear Materials held June 3 through June 21, 1985, at Santa Fe and Los Alamos, New Mexico, and San Clemente, California. Authorized by the US Nuclear Non-Proliferation Act and sponsored by the US Department of Energy in cooperation with the International Atomic Energy Agency, the Course was developed to provide practical training in the design, implementation, and operation of a state system of nuclear materials accountability and control that satisfies both national and international safeguards requirements. Major emphasis for the 1985 course was placed on safeguards methods used at item-control facilities, particularly nuclear power generating stations and test reactors. An introduction to safeguards methods used at bulk handling facilities, particularly low-enriched uranium conversion and fuel fabrication plants, was also included. The course was conducted by the University of California's Los Alamos National Laboratory and the Southern California Edison Company. Tours and demonstrations were arranged at the Los Alamos National Laboratory, Los Alamos, New Mexico, and the San Onofre Nuclear Generating Station, San Clemente, California.

47346 **(PPA-T—3) Report on the calculations of the height of the stack for PUSPATI laboratories.** (Unit Tenaga Nuklear, Bangi, Selangor (Malaysia)). Mar 1981. 19p. Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia.

This report outlines the method used in the calculation of the required stack height in order to ensure adequate dispersion and dilution of radioactive materials emitted through the stack under routine as well as accident conditions. The calculations were based on the most predominant radioactive material I-131, possibly to be discharged from the establishment. Some general assumptions were

considered and these include maximum activity of I-131, production efficiency, filter decontamination factor, MPCa value, topography, meteorological conditions, building wake effect, downwash and plume rise. The calculations have indicated that a stack of 40 meters in height is adequate.

47347 **(SAAS—336) Application of IAEA seals to spent-fuel cooling ponds at the Bruno Leuschner NPP, Greifswald.** Burmester, M.; Kahnmeyer, W.; Heidenreich, D.; Kannenberg, D. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic); VEB Kernkraftwerk Bruno Leuschner, Greifswald (German Democratic Republic)). 1985. 19p. (CONF-8410428—2). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703215.

From International meeting on technical means of nuclear material control at WWER-440 reactors and ways for optimizing their use for purpose of IAEA safeguards; Tbilissi, USSR (5 Oct 1984).

A description is given of the technical appliances developed and routinely used at the Greifswald NPP to allow IAEA seals to be attached to the spent fuel cooling ponds as a whole or to their lower storage levels.

47348 **(SAAS—337) Automatic image processing as a means of safeguarding nuclear material.** Kahnmeyer, W.; Willuhn, K.; Uebel, W. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). 1985. 14p. (CONF-8410428—3). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703216.

From International meeting on technical means of nuclear material control at WWER-440 reactors and ways for optimizing their use for purpose of IAEA safeguards; Tbilissi, USSR (5 Oct 1984).

Problems involved in computerized analysis of pictures taken by automatic film or video cameras in the context of international safeguards implementation are described. They include technical ones as well as the need to establish objective criteria for assessing image information. In the near future automatic image processing systems will be useful in verifying the identity and integrity of IAEA seals.

47349 **(SAND—86-1695C) Vehicle barrier systems.** Sena, P.A. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 7p. (CONF-860884—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014147.

From International carnahan conference on security technology; Gothenburg, Sweden (12 Aug 1986).

The ground vehicle is one of the most effective tools available to an adversary force. Vehicles can be used to penetrate many types of perimeter barriers, transport equipment and personnel rapidly over long distances, and deliver large amounts of explosives directly to facilities in suicide missions. The function of a vehicle barrier system is to detain or disable a defined threat vehicle at a selected distance from a protected facility. Numerous facilities are installing, or planning to install, vehicle barrier systems and many of these facilities are requesting guidance to do so adequately. Therefore, vehicle barriers are being evaluated to determine their stopping capabilities so that systems can be designed that are both balanced and capable of providing a desired degree of protection. Equally important, many of the considerations that should be taken into account when establishing a vehicle barrier system have been identified. These considerations which pertain to site preparation, barrier selection, system integration and operation, and vehicle/barrier interaction, are discussed in this paper. 2 tabs.

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0701 Physical Isotope Separation

REFER ALSO TO CITATION(S) 48210

0702 Radiation Sources

47350 **(AD-A—167968/7/XAB) Workshop report: nuclear techniques for mine detection research, July 22-25, 1985, Lake Luzerne, New York.** Moler, R.B. (Army Belvoir Research and Development Center, Fort Belvoir, VA (USA)). Jul 1985. 74p. NTIS, PC A04/MF A01.

The purpose of this workshop was to investigate the use of ionizing-radiation techniques for detecting land mines and, in particular, to identify technological advancements that would alter the assessment of the prior workshop held on March 1973. Although emphasis was placed on application of developed or emerging technology to the problem of the detection of buried land mines, detection of concealed explosives in the context of security was also considered. Automatic detection of explosives in luggage and hand-carried items received the greatest attention. Lesser attention was given to detecting explosives concealed within a building's structure. Three particular explosives detection scenarios were considered, and the requirements for each were explicitly discussed by panel members. The first of these, the detection of buried, nonmetallic, anti-vehicular mines, was the area of greatest concern and was given the greatest emphasis by the panel. The other two, detection of anti-personnel mines and detection of explosives in luggage and packages, were considered in less detail.

47351 **(DOE/AL/27458—T1) Shellfish depuration by gamma irradiation. Progress report No. 1, October 1, 1985-July 25, 1986.** Beghian, L.; Melnick, J. (Lowell Univ., MA (USA). Radiation Lab.; Baylor Univ., Houston, TX (USA). Coll. of Medicine). 25 Jul 1986. Contract FG04-84AL27458. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013887.

Objective is to investigate the feasibility of employing food irradiation technology to reduce or eliminate the threat of viral diseases contracted as a result of consumption of raw or inadequately cooked shellfish. Several recently published studies warn of the health risks associated with eating of raw shellfish - particularly American oysters, Crassostrea virginica, and the hardshelled clam, Mercenaria mercenaria. This study addresses the possibility of reducing the incidence of molluscanborne diseases through the application of ^{60}Co gamma irradiation processing to effect the inactivation of pathogenic viruses in live, raw shwllfish. Dosimetry, D_{10} doses, and organoleptic effects were studied.

47352 **(DOE/CH/10211—5) Use of gamma radiation as a form of preservation of sweet potatoes. [Final technical] quarterly progress report.** (Tuskegee Inst., AL (USA). Carver Research Foundation). [1985]. Contract FG02-84CH10211. 36p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014153.

This document covers: harvest and conditioning following harvest, harvest-curing-storage-irradiation schemes, irradiation, control sweet potatoes, analyses, enzymes results, and procedures for taste evaluation, storage rot, weevil. (DLC)

0703 Isotopic Power Supplies

REFER ALSO TO CITATION(S) 47523

47353 (CONF-860102—Summs., pp RG-1.1-RG-1.4) **Power performance of the general-purpose heat source radioisotope thermoelectric generator.** Bennett, G.L.; Lombardo, J.J.; Rock, B.J. (Dept. of Energy, Washington, DC). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The General-Purpose Heat Source Radioisotope Thermoelectric Generator (GRHS-RTG) has been developed under the sponsorship of the Department of Energy (DOE) to provide electrical power for the National Aeronautics and Space Administration (NASA) Galileo mission to Jupiter and the joint NASA/European Space Agency (ESA) Ulysses mission to study the polar regions of the sun. A total of five nuclear-heated generators and one electrically heated generator have been built and tested, proving out the design concept and meeting the specification requirements. The GPHS-RTG design is built upon the successful-technology used in the RTGs flown on the two NASA Voyager spacecraft and two US Air Force communications satellites. THe GPHS-RTG converts about 4400 W(t) from the nuclear heat source into at least 285 W(e) at beginning of mission (BOM). The GPHS-RTG consists of two major components: the General-Purpose Heat Source (GPHS) and the Converter. A conceptual drawing of the GPHs-RTG is presented and its design and performance are described.

47354 (CONF-860102—Summs., pp RG-2.1-RG-2.4) **Technology and hardware status of advanced modular radioisotope generator development.** Hartman, R.F.; Gorsuch, P.D.; Peterson, J.R. (General Electric Co., Valley Forge, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The modular Radioisotope Thermoelectric Generator (MOD-RTG) is currently under development for future space missions. The MOD-RTG is targeted to achieve performance greater than 3.5 watts/lb, and also incorporates improved thermoelectric materials as well as a multicouple thermoelectric converter which incorporates twenty thermoelectric conversion elements in a single device. The multicouple approach allows design modularity as well as significant performance improvement. This paper presents the hardware and technology status achieved by the ongoing MOD-RTG development program. Multicouple and materials technology as progressed to the point where multicouples are in production and fabrication of a Ground Demonstration System (GDS) converter is well underway. The GDS, which will produce 96 watts electric and contains 48 multicouples, is expected to confirm specific power capability greater than 3.0 watts/lb. and establish readiness for production of flight units for early 1990's space missions.

47355 (CONF-860102—Summs., pp RG-3.1) **Long life, highly survivable Rankine cycle dynamic isotope power system.** Niggeman, R.E.; Lacey, P.D. (Sundstrand Corp., Rockford, IL). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This paper describes the overall design and configuration of a highly survivable long life dynamic isotope power system using organic Rankine cycle power conversion technology. Spacecraft configuration is also discussed, as the approach followed is to consider the DIPS as part of an overall spacecraft system. While the focus is on systems requiring 1 Kwe to 10 Kwe the results could be applied to larger systems.

47356 (CONF-860102—Summs., pp RG-4.1-RG-4.2) **Brayton dynamic isotope power systems update.** Davis, K.A.; Pietsch, A.; Casagrande, R.D. (Space Power Systems, Advanced Technology, Phoenix, AZ). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Brayton dynamic power systems are uniquely suited for space applications. They are compact and highly efficient, offer inherent reliability due to only one moving part, and utilize a single phase and inert working fluid. Additional features include gas bearings, constant speed, and operation at essentially constant temperature. The design, utilizing an inert gas working fluid and gas bearing, is unaffected by zero gravity and can be easily started and restarted in space at low temperatures. This paper describes the salient features of the BIPS as a Dynamic Isotope Power System (DIPS), summarizes the development work to date, establishes the maturity of the design, provides an update on materials technology, and reviews systems integration considerations.

47357 (CONF-860102—Summs., pp RG-5.1-RG-5.3) **Survivability of the Dynamic Isotope Power System (DIPS).** Casagrande, R.D.; Glidden, G.; Niggeman, R. (General Electric Co., Philadelphia, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The Dynamic Isotope Power System (DIPS) has an inherent capability for hardening by virtue of its high temperature capability heat source and an energy conversion system that uses a mechanical heat engine. Incorporation of the DIPS into a spacecraft using a cylindrical, earth axis radiator was shown during the 1979 Nuclear Integrated Multi-mission Spacecraft (NIMS) study to result in a configuration that was hardened to the threat levels of interest at that time. Current threats that DOD spacecraft are expected to be designed against represent a significant departure from those contained in the 1979 study. This paper addresses the hardening capability of a DIPS using the current threat scenarios through an update of the 1979 study.

47358 **Brayton cycle space power systems.** Pietsch, A.; Trimble, S.W.; Harper, A.D. (Garrett Corp., Tempe, AZ). pp 1.446-1.451 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

The latest accomplishments in the design and development of the Brayton Isotope Power System (BIPS) for space applications are described, together with a reexamination of the design/cost tradeoffs with respect to current economic parameters and technology status. The results of tests performed on a ground test version of the flight configuration, the workhorse loop, were used to confirm the performance projections made for the flight system. The results of cost-model analysis indicate that the use of the highest attainable power conversion system efficiency will yield the most cost-effective systems. 13 references.

08 HYDROGEN

0801 Production

REFER ALSO TO CITATION(S) 47149, 47931

47359 **(EUR—10152-EN) Performance tests on new electrode materials for hydrogen production by water electrolysis. Final report.** Dams, R.A.J.; Giles, R.D.; Smith, T.P. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation; Central Electricity Generating Board, Harrogate (UK). Scientific Services Dept.). 1986. 197p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energy.

This report describes a programme of work to develop commercial manufacturing procedures for new electrocatalysts for the production of hydrogen by alkaline water electrolysis. The overall objective of the trial was to improve the efficiency of alkaline water electrolysis in a small low pressure electrolyser, designed to operate at 7 bar and 70°C and produce up to 1.5 Nm^3/h of hydrogen, using electrodes coated with Teflon bonded electrocatalysts developed from materials invented and laboratory tested at TCU. The anodic electrocatalyst was lithiated cobalt oxide, and that used on the cathode was nickel cobalt sulphide. The Teflon bonding material was chosen to improve the gas release mechanism from the electrode surfaces.

47380 **(NMERDI—2-73-4633) Hydrogen production with the electrocatalytic oxidation system. Final report.** Dhooge, P.M.; Henson, L.A. (Delphi Research, Inc., Albuquerque, NM (USA)). Jun 1986. 116p. NTIS, PC A06/MF A01 - NMERDI - Univ. of New Mexico, Suite M, 457 Washington SE, Albuquerque, NM 87108. File Number DE86901564.

A catalyzed, mediated electrochemical reaction to depolarize the anode of a hydrogen production cell was investigated. The reaction rates and activation energies for oxidation of wood chips, cattle manure and municipal sewage sludge by a number of catalyst/mediator combinations were investigated. Five combinations were chosen for extended testing in a laboratory-scale prototype reactor system, while measurements of current and potential levels, hydrogen production efficiencies, products of the biomass oxidations and catalyst/mediator solution stability were made. Results show that the process is practical and can be used in production of hydrogen from water at potentials of 1.0 volt or less. 17 refs., 20 figs., 10 tabs.

09 OTHER SYNTHETIC AND NATURAL FUELS

0901 Hydrocarbon Fuels

REFER ALSO TO CITATION(S) 47239

47381 **(DOE/ET—20009-T1) Full scale experimental anaerobic fermentation facility. Final report for design, construction, and operation.** (United Technologies Corp., East Hartford, CT (USA)). Jun 1981. 239p. NTIS $19.50.

Initial operation of a 25 ton/day manure-digestion facility at a feedlot in Bartow, Fla., indicates that it will be a technically and economically viable process. This report to the US Department of Energy details the design, construction, and operation of the facility.

47382 **(DOE/PC/40795—T3) Conversion of low H_2/CO ratio synthesis gas to hydrocarbons. Progress report, October 1-December 31, 1982.** Bell, A.T.; Heinemann, H. (California Univ., Berkeley (USA). Dept. of Chemical Engineering). 1982. Contract FG22-81PC40795. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE85008831.

The first goals of this project are: (1) to understand the influence of mass transfer on the performance of Fischer-Tropsch slurry reactors, and (2) to determine the nature of carbon formed during reaction. In reaching this second goal, knowledge of the catalyst composition will be useful. Experiments aimed at the understanding of mass transfer effects have been initiated and the first of these is discussed in this report. It is too early to draw definitive conclusions. After completion of the experiments on mass transfer, a determination of the rate of free carbon formation in the slurry reactor will be undertaken. The slurry will be analyzed for carbon, iron, and oxygen, via elemental analysis, and the solids will be analyzed by x-ray diffraction. This should allow us to determine the composition of the catalyst and the extent to which free carbon is formed during reaction, and may improve our understanding of the differences between the fixed bed reactor and the slurry reactor. Another potential set of experiments involves the use of solvents that exhibit varying degrees of miscibility with Fischer-Tropsch products. If deactivation occurs via coke formation from Fischer-Tropsch products, changing the miscibility of products in the slurry will change the rate of catalyst deactivation. Finally, it is proposed to study Fischer-Tropsch reactions with catalysts in which the active materials are deposited in the pores of a zeolite which are too small to permit coke formation. The exterior surface of the zeolite can be poisoned for acid catalyzed reactions. This will determine whether catalyst deactivation occurs primarily via accumulation of graphitic carbon.

47383 **(DOE/PC/70028—T7) Improved catalysts for liquid hydrocarbon fuels from syngas. Sixth quarterly technical progress report, January-March 1986.** (Union Carbide Corp., Tarrytown, NY (USA). Molecular Sieve Dept.). 1986. Contract AC22-84PC70028. 247p. NTIS, PC A11/MF A01; 1; GPO Dep. File Number DE86014659.

The catalyst testing for this quarter was focused on further understanding and developing the X_{11} promoted cobalt oxide component intimately contacted with the Molecular Sieve TC-123. Furthermore, the addition of new promoters, the addition of a water gas shift component, and the substitution of TC-123 with a new Molecular Sieve TC-121 and with γ-alumina was also studied. The use of the additional promoter X_{13} was found to increase the water gas shift activity of the X_{11} promoted Co/TC-123 catalyst. While the catalyst demonstrated excellent stability at 240C, it did, however, show considerable deactivation at 260C. The use of the additive X_9, geared towards improving the Co/S_{11}/TC-123 catalyst's stability at higher temperatures, appeared partially successful. The catalyst demonstrated high activity (about 75 percent CO + H_2 conversion at 260C, 500 psig, and a 1.5:1 H_2:CO) with a deactivation rate of only about one percentage point every 150 hours. The selectivity, however, remained excellent with about 9 percent CH_4 being produced throughout the 800 hour test period. Attempts to improve the water gas shift activity of the system by the simple addition of a separate water gas shift catalyst (K/Ni/Mo-γ-alumina) were unsuccessful. Similarly, the testing of the new Molecular Sieve TC-121 demonstrated inferior performance in both activity and selectivity when compared with the analogous TC-123 supported catalyst. The preliminary test results for these catalysts are summarized in Appendix A.

47384 **(DOE/PC/70809—T10) Microbial screening test for lignite degradation. Quarterly progress report No. 6, April-June 1986.** Yen, T.F. (University of Southern California, Los Angeles (USA)). 1986. Contract FG22-84PC70809. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013551.

Nitration followed by reduction has been used to directly incorporate amino groups into the macromolecular structure of lignite. This nitrogen enriched lignite was subjected to biodegradation. Since oxidation was accompanied with nitration, it is believed that a significant portion of nitrogen was evolved as NO_x. In order to avoid severe oxidation, nitronium salt such as nitronium tetrafluoroborate is recommended as the reagent for the nitration of lignite. Biodegradation of the methanol soluble fraction has been assessed. The solutions under investigation were analyzed by ion chromatography in order to determine the character of the biodegradation products of the bacterial species RC-W and RC-P, which were isolated in previous work. A new method of lignite modification is under development. Sodium metal was used to decompose methanol. The anions produced from this reaction attack the active sites present in the structure of lignite. FT-IR and FT-NMR were used to investigate the structured features of modified lignite. It is known that the activity of enzymes can be inhibited by the presence of sulfide. Elimination of sulfide content was carried out to assess the effect of sulfide on the biodegradation of lignite. 11 refs., 5 figs.

47385 **(EUR—9943-EN) Methane production by mariculture on land. Final report.** Wagener, K. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation; Technische Hochschule Aachen (Germany, F.R.)). 1985. 22p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energy.

It was the aim of this program to have the whole cycle running, consisting of algae production, harvesting, fermentation to biogas, and mineral nutrient recycling into the algae ponds in the form of the fermentation residue (sludge). For this purpose two pilot ponds with a total area of 160 m^2 have been installed and operated which provided a lot of new experience and success in this new field: concerning pond regime, harvesting procedure and species control. As a preparatory step for the fermentation at pilot scale (which is a subject of the next period), the anaerobic digesteability of micro and macro algae was tested at the laboratory scale.

The recycling of unoxidized fermentation sludge directly into the algae ponds has successfully been tested over a period of 4 months; it was finished by seasonal circumstances in November 1981. Finally, the productivities of 3 different algal strains, candidates for energy farming, were tested and compared. Tetraselmis showed the highest productivity yielding 65 tons/ha/yr, followed by Oscillatoria with about 88% of this, and Ulva with 68%. It seems, however, that with the last species the optimal yield has not yet been reached.

47366 **(PB—86-203361/XAB) Thermophysical properties of fluids for the gas industry. Annual report, January-December 1985.** Haynes, W.M. (National Bureau of Standards, Boulder, CO (USA). Thermophysics Div.). 21 Apr 1986. 379p. NTIS, PC A17/MF A01.

The report summarizes work carried out in calendar year 1985 in the Properties of Fluids Group, Thermophysics Division, National Bureau of Standards, Boulder, Colorado that was supported by the Gas Research Institute. The most important results included viscosity data for CO_2 + ethane mixtures; fugacity data for H_2 mixtures; development of sound-speed apparatus for measurements on gases to 10 MPa at temperatures from 250 to 350 K; sound-speed data for equimolar methane + ethane mixture; and theoretical studies of the extended corresponding states model, of mixing rules in conformal solution theory, and of the mean density approximation for molecules that differ greatly in size. The overall philosophy and technical resources of the group are discussed. Plans for the future are noted.

47367 **(PNL-SA—13853) Energy recovery from aquatic biomass in a thermochemical reactor.** Butner, R.S.; Elliott, D.C.; Sealock, L.J. Jr. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 18p. (CONF-860709—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014376.

From Conference on research and applications of aquatic plants for water treatment and resource recovery; Orlando, FL, USA (20 Jul 1986).

A series of experiments has been conducted to study the conversion of water hyacinths and macrocystis kelp to gaseous and liquid energy products in a catalytic thermal reactor. Treatment of the water hyacinths and kelp at 400-450°C in the presence of nickel and alkali catalysts resulted in moderate yields of medium-heating value (9.2-11.1 MJ/std m^3) gas. The gas was composed primarily of hydrogen, carbon dioxide, methane and other light hydrocarbon gases. Treatment of the same materials at lower temperatures (350°C) with the addition of an alkali catalyst only resulted in the production of both water soluble and water-insoluble organic material. Analysis of the resulting oils indicates that their chemistry is significantly different from oils produced by treating other lignocellulosic feedstocks under similar conditions. These differences have practical implications with regards to the utilization of the oils. 6 refs., 5 tabs.

47368 **Methane suppression from metal-zeolite catalysts in synthesis gas conversion.** Rao, V.U.S.; Gormley, R.J.; Schehl, R.R.; Chi, R.D.H.; Obermyer, R.T. (US Dept. of Energy, Pittsburgh Energy Technology Center, P.O. Box 10940, Pittsburgh, PA). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 169(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

The mechanism of synthesis gas conversion over cobalt-ZSM-5 catalysts to gasoline range hydrocarbons has been examined. There is a correlation between the methane yield and the percent aromatics in the liquid hydrocarbon product. This can be traced through the formation of additional alkanes (C_3H_8 and C_4H_{10}) accompanying the aromatization process. The alkanes undergo hydrogenolysis over cobalt leading to the formation of additional methane. The bifunctional catalysts 4.2% Co/SiO_2 + ZSM-5 made 1.7 times as much methane as Co/SiO_2 with a feed of H_2/CO = 1 at 280°C, 21 atm, and WHSV = 0.77. Under similar process conditions, 6.3% Co, 0.05% Cu/SiO_2 + ZSM-5 made nearly the same amount of methane as 6.3% Co, 0.05% Cu/SiO_2. Thus the addition of Cu to Co lowered the additional methane formation by reducing the rate of hydrogenolysis. C/sub 5+/ yield with the bifunctional catalyst increased from 72% to 76% upon the addition of Cu.

47369 **Studies of carbon deposition and consumption on Ru/TiO_2 during Fischer-Tropsch synthesis.** Yokomizo, G.; Bell, A.T.; Duncan, T.M. (Materials and Molecular Research Div., Lawrence Berkeley Lab. and Dept. of Chemical Engineering, Univ. of California, Berkeley, CA). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 182(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

Isotropic tracer techniques have been used to characterize the dynamics of carbon deposition on the surface of a Ru/TiO_2 catalyst during Fischer-Tropsch synthesis and ^{13}C-NMR spectroscopy has been used to characterize the structure of the deposited carbon. Elemental carbon, designated C/sub α/ is formed very rapidly, whereas alkyl carbon, designated C/sub β/ accumulates much more slowly. The influence of catalyst reduction on temperature, reaction conditions, and time under reaction conditions on the surface concentrations and reactivity of C/sub α/ and C/sub β/ will be discussed. It will be shown that C/sub β/ progressively becomes less reactive and may be the precursor to the formation of graphitic carbon.

47370 **Manganese oxide as a promoter for C_2-C_4 olefin production in the hydrogenation of carbon dioxide.** Kim, C.; Chen, K.; Hanson, F.V.; Oblad, A.G.; Tsai, Y. (Dept. of Fuels Engineering, Univ. of Utah, Salt Lake City, UT). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 198-207(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

A number of active research and development programs have been initiated to explore the potential of CO hydrogenation process as a source of low molecular weight (C_2-C_4) olefins. Metal catalysts such as Co-Mn, Ni-zeolite, Rd and Mo have been evaluated for low molecular weight olefin selectivity. The coprecipitated Fe-Mn system (Mn/Fe=9/1) was reported to be highly olefin selective. Recently, many investigators reported supporting evidence for the promotional effect of Mn for precipitated Fe catalysts. In this study, Raney Fe promoted with Mn has been evaluated for C_2-C_4 olefin selectivity in the hydrogenation of CO relative to coprecipitated Fe-Mn catalysts. Catalyst characterization, including BET surface area, X-ray diffraction, selective chemisorption and ESCA, has been carried to provide insight into the role of manganese in both the Coprecipitated and Raney catalyst systems.

47371 **The influence of TiO/sub x/ promoters on the chemisorption and hydrogenation of CO on polycrystalline Rh.** Levin, M.; Bell, A.T.; Salmeron, M.; Somorjai, G.A. (Materials and Molecular Research Div., Lawrence Berkeley Lab.; Dept. of Chemical Engineering and Chemistry, Univ. of California, Berkeley, CA). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 317(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

A study has been conducted of the influence of TiO/sub x/ moieties deposited on the surface of a polycrystalline Rh foil on the chemisorption and hydrogenation of CO. With increasing TiO/sub x/ coverage, the coverage by CO falls off faster than expected for simple site blockage and the overall strength of CO adsorption is weakened. The rate of CO methanation passes through a maximum at a TiO/sub x/ coverage of 15%. At the maximum, the rate of methane formulation is more than ten-fold greater than that observed for clean Rh. It is also found that with increasing TiO/sub x/ coverage, an increasing proportion of C^+_2 products are formed and the olefin to paraffin ratio rises. All of these effects are discussed in terms of a model of the TiO/sub x/-decorated Rh surface.

0902 Alcohol Fuels

REFER ALSO TO CITATION(S) 47166

47372 **(CONF-860405—6) Fermentation of lignocellulosic feedstocks: product markets and values.** Gaines, L.L.; Karpuk, M. (Argonne National Lab., IL (USA); Solar Energy Research Inst., Golden, CO (USA)). 1986. Contract W-31-109-ENG-38. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014580.

From 10. annual symposium on energy from biomass and wastes; Washington, DC, USA (7 Apr 1986).

Ethanol is the primary product of biomass hydrolysis and fermentation processes. The quantity and quality of coproducts depend on the feedstock and on the process steps employed. When the feedstock is lignocellulosic - wood or herbaceous energy crops, such as napier grass or kenaf - substantial quantities of lignin and five-carbon sugars and derivatives are produced, and the sale of these and other coproducts has a potentially large impact on the economics of fuel alcohol production. For each product, potential markets and materials competing for these markets (or competing routes to the same product) are identified. The value of ethanol as a chemical, octane enhancer, and fuel is estimated. Coproduct credits are calculated, and the potential benefits resulting from coproduct recovery are estimated. The quantity of each material that could be produced by fermentation is compared with the size of potential markets. Where coproducts of substantial fuel ethanol manufacture could saturate their markets, the question of whether early sales could serve as a wedge to ethanol market penetration is addressed. 20 refs., 7 figs., 3 tabs.

47373 **(NIPER—101) Effect of methanol fuel formulations on exhaust products. Status report.** Wares, R.N. (National Inst. for Petroleum and Energy Research, Bartlesville, OK (USA)). 11 Sep 1985. Contract FC22-83FE60149. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014738.

Five methanol fuels were utilized in two Ford Escorts specifically designed for neat methanol consumption. The methanol-based fuel blends contained up to 30% hydrocarbons by volume and covered a wide range of volatility. Exhaust emission results show small changes in HC and NO/sub x/ emissions with the addition of hydrocarbons to methanol. Blends containing high vapor pressure Indolene exhibited large increases in CO. For both vehicles, aldehydes were decreased with the displacement of methanol by Indolene. Addition of a 15 volume-percent low Reid vapor pressure (RVP) Indolene produced the highest volumetric fuel economy. Evaporative emissions were lowest with neat methanol as fuel and up to 250% higher with the addition of 30-volume-percent Indolene with RVP modified to a higher level. No driveability problems occurred with any of the fuels in these automobiles. 8 tabs.

47374 **Progress in the Laporte LPMEOH PDU project.** Mednick, R.L.; Klosek, J. New York, NY; American Institute of Chemical Engineers (1986). 18p. (CONF-860447—).

From American Institute of Chemical Engineers spring national meeting; New Orleans, LA, USA (6 Apr 1986).

The technology development path that led to LaPorte has included two reactor modes: an ebullated-bed (also called liquid-fluidized) reactor which uses an expanded bed of catalyst extrudates, and a slurry (also called liquid-entrained) reactor where the catalyst is dispersed in powder form. Research on the liquid-fluidized system was begun by Chem Systems in 1975 using a 2.5-cm diameter by 1.8-m high bench-scale reactor. Development subsequently progressed through an intermediate-scale lab PDU and then to the Laporte PDU. The LaPorte PDU has a reactor approximately 0.6-m in diameter by 5.5-m high and a nominal capacity of 4.5 metric tons per day of methanol. Research on the liquid-entrained system began in 1979 in stirred autoclaves and then progressed through an intermediate scale lab PDU to the LaPorte PDU.

47375 **Method and apparatus for synthesizing hydrocarbons.** Colmenares, C.A.; Somorjai, G.A.; Maj, J.J. (to Dept. of Energy). US Patent Application 6-723,713. 16 Apr 1985. 28p. Contract W-7405-ENG-48. DE86013805 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013805.

A method and apparatus for synthesizing a mixture of aliphatic alcohols having five carbons or less is disclosed. An equal molar ratio of CO and H_2 gases is caused to pass through a ThO_2 catalyst having a surface area of about 80 to 125 m^2/g. The catalyst further optionally includes Na ions present as substitutional cations in an amount of about 5 to 10 atom %. At a temperature of about 570 to 630°K, and at pressures of about 20 to 50 atm, methanol and isobutanol are the predominant products and are produced in amounts of about 90 wt % of the total hydrocarbon mixture. 6 figs.

0904 Solid Waste And Wood Fuels

REFER ALSO TO CITATION(S) 47888

0906 Gaseous Waste Fuels

REFER ALSO TO CITATION(S) 47386

13 HYDRO ENERGY

1303 Plant Design And Operation

47376 **(DOE/ID/12155—T1) Schneider hydrodynamic power generator prototype installation, test and evaluation. Volume 1. Final report.** (Turlock Irrigation District, CA (USA)). Apr 1986. Contract FC07-80ID12155. 82p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014909.

The report partially documents an attempt to build and operate a hydropower plant at a Turlock Irrigation District canal utilizing a Schneider Engine machine. The purpose of the project was to demonstrate economic and technical viability of the Schneider Engine in an irrigation canal setting and collect operation and maintenance data for one complete irrigation season after completion of the plant. The plant was to use 417 cfs of water at 7 feet of head to produce about 192 kW. The plant was built and operated intermittently for up to a week at a time producing up to 133 kW. On June 5, 1984 after many delays and mechanical problems associated with the prototype turbine and drive system, the unit failed catastrophically and subsequently has not operated.

47377 **(DOE/ID/12155—T2) Schneider hydrodynamic power generator prototype installation, test and evaluation. Volume 2. Appendix. Final report.** (Turlock Irrigation District, CA (USA)). Apr 1986. Contract FC07-80ID12155. 333p. NTIS, PC A15. File Number DE86014910.

Purpose of the project was to demonstrate economic and technical viability of the Schneider engine in an irrigation canal. The plant was to use 417 cfs of water at 7 ft head to produce 192 kW. This volume contains the following appendices: construction drawings, Schneider engine as-built drawings, test procedure and data, civil design report, construction specifications, and news articles. (DLC)

47378 **(DOE/RA/01699—5) City of Idaho Falls hydroelectric demonstration project. Final operations and maintenance report.** (Idaho Falls, City of, ID (USA)). May 1986. Contract FC07-78RA01699. 47p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014204.

This report describes the major steps undertaken by the City of Idaho Falls to develop a low-head hydroelectric project and to demonstrate the economic feasibility of such a project. This report, written as a requirement of the Cooperative Agreement between the City of Idaho Falls and the United States Department of Energy, summarizes the operation and maintenance activities, costs and revenues for the initial three years of operation.

47379 **(EPRI-EM—4599-Vol.1) Ultrahigh head pump/turbine development program. Volume 1. Technical summary. Final report.** Yokoyama, T. (Hitachi Ltd., Ibaraki (Japan). Hitachi Works). Jul 1986. 449p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920430.

The commercial availability of an ultrahigh head pump/turbine whose output can be regulated makes underground and ultrahigh head-pumped storage creditable options for utility use by reducing construction costs and plant complexity. This new turbine operates at double the head of existing equipment yet uses commercial materials, proven design concepts, and manageable manufacturing techniques.

1306 Environmental Aspects

REFER ALSO TO CITATION(S) 48781

47380 **(DOE/BP/11548—1) Hells Canyon environmental investigation. Final report.** (USDOE Bonneville Power Administration, Portland, OR. Office of Power and Resources Management). Jan 1985. Contract AC79-83BP11548. 306p. NTIS, PC A14/MF A01; 1; GPO Dep. File Number DE86013878.

The Water Budget plan would provide additional flows in the Columbia and Snake Rivers between April 15 and June 15 to improve the survival of downstream migrating salmon and steelhead. The plan calls for 20,000 cubic feet per second-months (beyond the firm power flow) to be delivered to Lower Granite pool as the Snake River contribution to the Water Budget. This water would come from Idaho Power Company's (IPCo) Hells Canyon Complex (principally, Brownlee Reservoir) and the US Army Corps of Engineers' Dworshak Reservoir. This report contains the results of an environmental investigation of the nonpower impacts on the Hells Canyon Complex investigation. The environmental investigation evaluated three Water Budget scenarios, or levels of participation, developed by IPCo. These scenarios involve drawdowns of Brownlee Reservoir to three elevations, or floor levels (2036, 2050, and 2065), for Water Budget flows. A total of nine discipline areas were studied. These include natural features (geology); water use; water quality; fish, botanical, and wildlife resources; air quality; land use; historical and archeological resources; recreational resources; and aesthetic resources. Within each discipline, the report presents the existing conditions, the potential impacts associated with each scenario, information deficiencies and needed studies, and references.

47381 **(PNL-SA—13422) Fisheries evaluation of fish screening facilities in the Yakima Basin, Washington.** Neitzel, D.A.; Abernethy, C.S. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 7p. (CONF-860757—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013595.

From Western Division of the American Fisheries Society annual meeting; Portland, OR, USA (21 Jul 1986).

Diversion screens constructed in the Sunnyside Dam and Canal were evaluated to determine if scale loss occurred to fish during passage through the screen facility. (ACR)

14 SOLAR ENERGY

1401 Resources And Availability

47382 **Method and apparatus for measuring solar radiation in a vegetative canopy.** Gutschick, V.P.; Barron, M.H.; Waechter, D.A.; Wolf, M.A. (to Dept. of Energy). US Patent Application 6-729,022. 30 Apr 1985. 13p. Contract W-7405-ENG-36. DE86013710 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013710.

An apparatus and method for measuring solar radiation received in a vegetative canopy. A multiplicity of sensors selectively generates electrical signals in response to impinging photosynthetically active radiation in sunlight. Each sensor is attached to a plant within the canopy and is electrically connected to a separate port in a junction box having a multiplicity of ports. Each port is connected to an operational amplifier. Each amplifier amplifies the signals generated by the sensors. Each amplifier is connected to an analog-to-digital convertor which digitizes each signal. A computer is connected to the convertors and accumulates and stores solar radiation data. A data output device such as a printer is connected to the computer and displays the data.

1405 Solar Energy Conversion

REFER ALSO TO CITATION(S) 47361, 47365, 48199

47383 **(AD-A—167415/9/XAB) High-efficiency double-heterostructure AlGaAs/GaAs solar cells.** Gale, R.P.; Fan, J.C.C.; Turner, G.W.; Chapman, R.L. (Massachusetts Inst. of Tech., Lexington (USA). Lincoln Lab.). 25 Oct 1985. 5p. (MS—6970). NTIS, PC A02/MF A01.

Double-heterostructure solar cells were fabricated from wafers prepared by using organometallic chemical vapor deposition to grow a p GaAs absorbing layer sandwiched between p+ and n+ AlGaAs layers. The best cell, which incorporates an abrupt AlGaAs/GaAs shallow heterojunction, exhibits a global AM1 one-sun conversion efficiency of 23%. The rate at which the open-circuit voltage decreases with increasing temperature is lower for the double-heterostructure cells than for GaAs shallow-homojunction cells.

47384 **(BMFT-FB-T—86-003) Development of new solar cells from poly-silicon, silicon powder and new compound semiconductors suitable for thin film cells. Final report.** Bucher, E.; Munz, P.; Lux-Steiner, M.C.; Frankowski, I. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Konstanz Univ. (Germany, F.R.). Fakultaet fuer Physik). Jan 1986. 38p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE86752545.

With p-Si/Sc MIS cells with 4 cm^2 area we achieved Vsub(oc) (AMO) = 632 mV and an efficiency eta of 12.5%. Vsub(oc) and jsub(sc) were studied as functions of the Boron-doping for s.c. cells and p-Silso. From S-Web and sintered Si-powder Sc MIS cells were made with efficiencies of 6.6 and 2.7% respectively, whereas with Heliosil material eta = 9.5%. Cells with sputtered Sc were also investigated. eta = 8% was found reproducibly. Schottky diodes made from n-Si/IrSisub(1.75) were explored, but low Vsub(oc)'s of 350-400 mV found. Si-wafers made from Si-powder were produced and studied by means of capacitor discharge and vacuum arc plasma spray techniques. New diodes from compound semiconductors: p-Zn_3P_2/Sc, p/n WSe_2, p-WSe_2/n-$MoSe_2$, p-WSe_2/n-$ZrSe_2$, p-WSe_2/n-CdS were studied, the latter with best efficiencies of 6.2% and maximum Vsub(oc) of 630 mV; sintered p-WSe_2/CdS was also made with eta = 0.8%. With 4 refs., 3 tabs., 8 figs.

47385 **(BMFT-FB-T—86-008) Investigation of the optical properties of solar cells. Final report.** Bischoff, K.; Kaase, H.; Metzdorf, J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Physikalisch-Technische Bundesanstalt, Berlin (Germany, F.R.); Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.)). Jan 1986. 61p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752547.

A metrological scale for the AMn weighted spectral responsivity and the efficiency of solar cells has been established. Therefore an indirect procedure, the method of the differential spectral responsivity, was developed. The relative uncertainty is less than 2%. With integral direct measurements (solar simulator method) comparable results can only be obtained by using a calibrated reference solar cell. In crystalline Si solar cells with p-type base a photoinduced enhancement of the responsivity was observed, increasing with a decrease of the purity of the base material (photoaugmentation). The measured effective diffusion length of minority carriers in the base is correlated with the photoaugmentation. With 24 refs., 1 tab., 18 figs.

47386 **(BMFT-FB-T—86-009) Development of a process to gasify biomass based on the principle of a circulating fluidized-bed. Final report.** Mehrling, P.; Reimert, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Jan 1986. 40p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE86752543.

A biomass gasification process was developed. The gasification tests in a pilot plant using different types of wood showed the feasibility of the process. During test runs, a tar-free gas, high carbon conversion and uniform temperature distribution were

achieved, showing that the predicted advantages were actually achieved. The plant has specific heat loss of approx. 15%. However, a cold gas efficiency of 78% could be achieved and a fuel gas was produced with a calorific value of 5,930 kJ/m³ under dry and normal conditions. Cost estimation show, that with low-cost feedstocks (wastes) coproduction of electrical energy and process heat via circulating fluidized-bed biomass gasification is competitive at market prices. With 14 refs., 6 tabs., 9 figs.

47387 (DOE/CE/15239—T3) Photovoltaic membrane (PVM) roof system. Second quarter technical progress report, 1986. Francovitch, T.F. (Single-Ply Inst. of America, Inc., Pasadena, MD). 25 Jul 1986. Contract FG01-85CE15239. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013244.

A roof construction has a substantially flat, horizontal substrate, which may be of insulating material, having mounted thereon at least one structure having an inclined surface. A membrane of water-impervious material extends over the substrate and over the structure. The portion of the membrane covering the inclined surface of the structure has photocells thereon, the inclination and orientation of the inclined surface being selected for maximum radiation reception from the sun. The structure may be of generally triangular shape, is thermally insulating, and a plurality of parallel structures may be provided, with photocells on parallel, inclined surfaces. The structures may have additional surfaces which are opposite and facing the first mentioned surface of an adjacent structure, which additional surface or surfaces is provided with a reflective film for reflecting radiation into the photocells of the adjacent structure.

47388 (EUR—10014-EN-FR) Methane production by anaerobic digestion of algae. Final report. Asinari di San Marzano, C.M.; Collard, F.; Dujardin, E.; Legros, A.; Naveau, H.; Nyns, E.J.; Sironval, C. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation; Louvain Univ. (Belgium)). 1985. 146p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energy.

The objective of the five year period covered by this summary was to assess the possibility to obtain methane from algae by anaerobic digestion. A 1 m³ pilot plant was set up in Lamezia-Terme (Calabria, Italy) with the algae Tetraselmis. It was the first biogas pilot plant working on an energy crop in Europe. The following design data could be computed: 10 ha ponds will produce daily 1.7 t algal dry mass to be biomethanized in a once-through methane digester of 340 m³ working volume, producing daily 600 m³ biogas (15-6 GJ). The overal system is an elegant socio-economical solution to the energy needs of rural communities in arid mediterranean areas. The biogas plant, taken alone, meets the basic requirements for economical feasibility.

47389 (EUR—10146-IT) Utilization of forest biomass for energy production and industrial purposes. Final report. Scaramuzzi, G. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1985. 61p. (In Italian). Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energia.

The project is part of a larger one promoted by the Italian Agency for Cellulose and Paper (E.N.C.C.) for an enhanced utilization of coppice forests in Italy. It concerns a Turkey oak (Quercus cerris) stand in Calabria. Stand characteristics and results of harvesting trials, first after-felling observations and technological investigations are reported. Results of an estimate of coppice forests biomass availability and of possibilities of expanding its use for energy are also given. Machinery damage to stumps was greatly reduced (1.7% of high-damaged stumps) by sprouts concentration by skyline. Sprouts weight appeared as a major factor affecting harvesting yield, Harvesting costs varied with different stand and terrain characteristics from 28,000 to 39,500 It. liras/t. Because of the high transport costs, the use of current coppice forests biomass is restricted within a short distance from the harvesting area. Industrial trials for fiberboard and paper pulp production from coppice whole-tree chipped biomass proved the possibility of its use in mixture with current raw material up to 75% for fiberboard production and up to 35-50% for corrugated paper pulp production. Relative expansion possibilities of coppice forest biomass consumption for energy were estimated, mainly localized in the central-northern Appennine and the Alpine areas. Given the permanence of a high convenience for its home consumption, wide development programs for coppice biomass industrial use for energy appear to be inconvenient. On the other hand, its use by local communities (schools, hospital, etc.) might be incentived in particular areas with high coppice production potential far from wood industries.

47390 (EUR—10147-EN) Pressurized gasification test facility. Construction. Final report. Wilson, H.T. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation; Foster Wheeler Power Products Ltd., London (UK)). 1985. 80p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energy.

This document summarises the key design elements associated with the construction of a test plant for pressurised gasification of biomass, to be used to establish future operational parameters and process equipment specifications for commercial facilities. It is a multi-functional plant which not only permits operation with selected parameters such as temperature, pressure, flow rates and so on, but also alteration of the reactor geometry and type within the system. The value of theoretical studies has been highlighted as a means of reviewing wide ranging experimental programmes, both for information and selecting potential experimental areas. The parallel theoretical studies which were derived from extensive general experience, related to chemical equilibrium in the carbon hydrogen oxygen system, show quite clearly that there is little merit in designing a test plant of this kind to operate at pressures in excess of 10 bars, due to an invariance in product gas composition which develops beyond the 10 bar pressure level.

47391 (LAAS—755) Reduction of radiation damage in solar cells. A study of radiation defects in silicon. Final Report. Bernard, J.; Reulet, R.; Roux, M.; Bielle-Daspet, D.; Lagouin, M.; Bourgoin, J.; Stievenard, D.; Castaner-Munoz, L.; Alcubilla, R.; Prat, L. (Centre National de la Recherche Scientifique, 31 - Toulouse (France)). Jan 1983. 219p. (ESA-CR(P)—2118). NTIS, PC A10/MF A01.

In order to quantitatively predict the degradtion of solar cells under space conditions a theoretical and experimental study was carried out. The effects of resistivity (10 and 1 ohm cm), doping (boron or gallium) and oxygen on the degradation induced by energetic electrons and illumination on silicon solar cells were evaluated. The room temperature degradation of GaAs structures was studied. A gallium doped silicon appears promising for improved solar cells. Capacitance transient spectroscopy results show that the behavior of hole traps agrees with the variation of the solar cell parameters. The GaAs results indicate that the total recovery of the 1 MeV irradiation defects is obtained by 20 min annealing at 220 C, but defect production and recovery may vary with the structure technology.

47392 (N—86-24007) Superlattices and NiPi structures in new forms of cascade solar cells. Semiannual Report, 23 October 1985-22 April 1986. Leburton, J.P.; Hess, K. (Illinois Univ., Urbana (USA)). 1986. 11p. (NASA-CR—176718; SAR—4). NTIS, PC A02/MF A01.

The activity in the field of photovoltaic semiconductor superstructures is described. Progress was accomplished in the two principal directions previously defined in our initial proposal, i.e.: (1) Theoretical investigation of the optical properties of superlattices; and (2) New solar cell concepts and device modeling. Although important information concerning the optical constants of superlattices and multiple quantum well structures was obtained from our computer model, most of the theoretical efforts have progressively shifted from the former to the latter aspect of the project because of the discovery of a new kind of photovoltaic device which may exhibit improved performances with respect to conventional solar cells.

47393 **(SERI/STR—211-2962) Research on single-crystal CdTe solar cells. Annual subcontract report, 1 February 1985-1 February 1986.** Borrego, J.M.; Ghandhi, S.K. (Rensselaer Polytechnic Inst., Troy, NY (USA)). Jun 1986. Contract AC02-83CH10093. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86010719.

This report outlines work carried out during Phase I of growth and characterization of single-crystal CdTe layers to explore their potential in high-efficiency solar cells. High-quality InSb layers can be grown by organometallic vapor phase epitaxy (OMVPE). Layers have been grown whose photoluminescence peak has a full width half maximum of 5.8 MeV, the lowest value achieved to date in epitaxial layers of this compound semiconductor. CdTe layers with featureless morphology were grown at 350° to 420°C. All layers are n-type. A hole lifetime of 1.5 micrometers was measured by optical techniques and corroborated by DLTS measurements. Both Schottky and p^+-n junction cells have been made on these layers. Device characteristics are contained in the report.

47394 **(SERI/STR—211-2972) Tandem thin-film solar cell using Cd/sub y/Zn/sub 1-y/Te as the wide bandgap component. Annual subcontract report, 1 April 1985-1 April 1986.** Zanio, K. (Ford Aerospace and Communications Corp., Newport Beach, CA (USA)). Jun 1986. Contract AC02-83CH10093. 26p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86010720.

The objective of this research program was to develop CdZnTe as the wide-bandgap component for all-thin-film, polycrystalline tandem solar cell. Single-crystal and polycrystalline CdZnTe films containing about 0.20 mole fraction of ZnTe corresponging to a bandgap of 1.65 eV were deposited by congruent evaporation in uhv on sapphire and ITO/glass substrates. CdZnTe and single-crystal CdTe films, semi-insulating as grown films, were annealed to p-type in Te overpressures. The Hall mobilities and carrier concentration ranges for the films were respectively 20 to 75 $cm^2/V\text{-}s$ and 5 x 10^4 - 10^{16} cm^{-3}. The use of Hg(Cd,Zn) Te alloys reduced contact resistances as low as 0.1 $ohm\text{-}cm^2$. Indium Schottky barriers of 0.9 eV were observed on CdZnTe single-crystal thin films.

47395 **Voltage and light bias-dependent spectral response of the $CuInSe_2$/Cd(Zn)S thin-film solar cell.** Eron, M. (RCA David Sarnoff Research Center, Princeton, New Jersey 08543-0432). *Journal of Applied Physics;* **60**: No. 6, 2133-2136(15 Sep 1986).

In this paper, experimental results of bias- and light-dependent spectral response measurements of $CuInSe_2$/Cd(Zn)S thin-film solar cell and its consequences are discussed. The dc measurements are analyzed in light of new data and their consistency with chopped light measurements are reiterated. Experimental evidence also suggests that, at least in some cells, at high forward bias, reversal of photocurrent occurs. Present models for the bias- and light-dependent collection factor are also reviewed.

47396 **Charge separation and energy transfer in carotenopyropheophorbide-quinone triads.** Liddell, P.A.; Barrett, D.; Makings, L.R.; Pessiki, P.J.; Gust, D.; Moore, T.A. (Arizona State Univ., Tempe). *Journal of the American Chemical Society;* **108**: No. 17, 5350-5352(20 Aug 1986). Contract FG02-84CH10198.

In natural photosynthesis membranes, chlorophyll molecules serve as the site of the initial photodriven charge separation. In addition, they play a role in subsequent electron-transfer steps, accept singlet excitation energy from carotenoid antenna molecules, and transfer triplet energy to carotenoid acceptors (thereby preventing sensitized singlet oxygen production and subsequent photodamage to the organism). The authors report herein the synthesis and study of chlorophyll-based carotenopyropheophorbide-quinone triad molecules which mimic all of these natural processes.

47397 **Apparatus for converting biomass to a pumpable slurry.** Ergun, S.; Schaleger, L.L.; Wrathall, J.A.; Yaghoubzadeh, N. (to Dept. of Energy, Washington, DC). US Patent 4,597,832. 1 Jul 1986. Filed date 1 Oct 1981. vp.

An apparatus is described for converting lignocellulosic material to a pumpably slurry comprising: means for receiving material to be converted, means for pressurizing he material to be converted, heated means operatively connected to the receiving means and the pressurizing means and having no moving mechanical elements therein for treating the material under pressure and temperature for a period of time, means operatively connected to the heated treating means for recirculating at least a portion of the treated material through the heated treating means, and refining means operatively connected to receive a portion of the treated material from the recirculating means for producing finely ground particles of the treated material.

47398 **(N—86-23622) Japan's participation in space station design: feasibility study of GaAs solar cells for space station applications.** (National Aeronautics and Space Administration, Washington, DC (USA)). Mar 1986. Translation of Bei Koku Uchu Kichi Keikaku Yobi Setsu Keisan ka GaAs Dei Tairo Denchi Seru No u Chu Kichi e No Tsuyosei No Kento, Rept. ST-E—0739, National Space Development Agency of Japan, Japan, 1-4(18 Dec 1985). (NASA-TM—88384). 57p. NTIS, PC A04/MF A01.

The report gives the results of feasibility studies and a cost analysis done on GaAs solar battery cells for space stations. The studies and their results are as follows: (1) Cell size - The 2 x 4 cm cell size was found superior to the 4 x 4 cm cell; (2) Manufacturing technology - Overall, LPE crystal growth was found more suitable than MO-CVD. Current technology for post-growth processes and applying large-area cover glass can be used with few or no modifications; (3) Cell assemblies - Tests for mechanical and thermal stresses encountered from assembly through operation are recommended; (4) Procuring materials - Steps should be taken to avoid sharp price increases due to a speculative gallium market. There are no problems with arsenic materials; (5) Production facilities - The capital investment needed remains to be determined, but a working area of 4000 m2 will be required; (6) Cell costs to be determined; (7) Cell development-supply plan - Two-year lead time will be needed to develop the necessary technology and prepare for production.

47399 **Superlattice photoelectrodes for photoelectrochemical cells.** Nozik, A.J. (to Dept. of Energy). US Patent Application 6-751,413. 3 Jul 1985. 45p. Contract AC02-83CH10093. DE86013695 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013695.

The application of superlattice semiconductors as photoelectrodes in photoelectrochemical energy conversion processes is described. The invention is comprised of a multiple quantum well, or superlattice, semiconductor positioned on a plate and encapsulated in an insulation material, except the top surface, which is left exposed. An opening in insulation exposes a portion of the plate. When the photoelectrochemical cell is immersed in a liquid electrolyte and exposed to solar radiation, a redox reaction occurs, producing gases such as hydrogen and oxygen from a water electrolyte, which bubble off the cathode and anode portions of the cell. (LEW)

47400 **Development and testing of advanced fire-resistant photovoltaic modules.** Sugimura, R.S.; Otth, D.H.; Ross, R.G. Jr. (California Institute of Technology, Pasadena). pp 337-343 of Institute of Environmental Sciences, Annual Technical Meeting, 31st, Las Vegas, NV, April 30-May 2, 1985, Proceedings. Mount Prospect, IL; Institute of Environmental Sciences (1985). (CONF-850450—).

From 31. annual meeting of the Institute of Environmental Sciences; Las Vegas, NV, USA (29 Apr 1985).

The evaluation of back-surface materials flammability in order to identify fire resistant module designs is examined. The fire test apparatus, burning-brand test sequence, and spread-of-flame test sequence are described. Video recordings and time-temperature profiles of module back surfaces are utilized to study the flammability failure mechanism and identify high-temperature materials. A table of flammability test results for various module designs is provided. The data reveals that 2-mil kapton, fiberglass cloth coated or impregnated with a material to plug pores, and metal foil back-surface materials achieve class A and B fire-resistance levels, and are applicable for photovoltaic module designs. 6 references.

47401 **Potential of thin-film solar cell module technology.** Shimada, K.; Ferber, R.R.; Costogue, E.N. (California Institute of Technology, Pasadena). pp 3.460-3.465 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

During the past five years, thin-film cell technology has made remarkable progress as a potential alternative to crystalline silicon cell technology. The efficiency of a single-junction thin-film cell, which is the most promising for use in flat-plate modules, is now in the range of 11 percent with 1-sq cm cells consisting of amorphous silicon, $CuInSe_2$ or CdTe materials. Cell efficiencies higher than 18 percent, suitable for 15 percent-efficient flat plate modules, would require a multijunction configuration such as the CdTe/$CuInSe_2$ and tandem amorphous-silicon (a-Si) alloy cells. Assessments are presented of the technology status of thin-film-cell module research and the potential of achieving the higher efficiencies required for large-scale penetration into the photovoltaic (PV) energy market. 10 references.

47402 **Liquid junction photovoltaic devices utilizing organic thin film electrodes.** SLinkous, C.A.; Armstrong, N.R. (Brookhaven National Lab., Dept. of Applied Science, Building 801, Upton, NY 11973). pp 384-388 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

The application of organometallic phthalocyanines as p-type semiconductors in photoconductive and photovoltaic devices is described. The advantages of liquid junction photovoltaic devices are also described. Preliminary voltammetric data exemplifying types of photoresponse far various phthalocyanine derivatives are given.

1406 Photovoltaic Power Systems

47403 **(BMFT-FB-T—86-006) Germano-Korean cooperation for erection and test of industrialized solar technologies. Final report.** Pfeiffer, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Maschinenfabrik Augsburg-Nuernberg (M.A.N.) A.G., Muenchen (Germany, F.R.). Bereich Neue Technologie). Jan 1986. 108p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752544.

A combined small solar-wind power station and a solar-thermal experimental plant were built and put into operation in the Republic of Korea. These plants are designed to demonstrate the effective exploitation of solar energy and wind energy and the enhanced availability achievable through combination of these two energy sources. To these ends a 14 kWsub(e1) wind energy converter AEROMAN 11/14 and a 2.5 kWsub(e1) solar-cell generator HELIOMAN-PV were operated in parallel. The bi-axial tracking system used on the solar generator leads to increased and constant generation of electricity throughout the day. A newly-developed consumer control system switches the energy generators and the consumers in autonomous mode according to changing supply and demand. The solar-powered air-conditioning unit operates with an absorption type refrigerating unit, high-output flat collectors and an automatic control system. All design values were achieved on start-up of the plant. In a test and measurement phase it is now to be demonstrated that the plants can be used for the reliable generation of energy in a number of individual applications. The successful Germano-Korean cooperation is to be continued in the construction of further such plants for several Korean islands. With 14 tabs., 41 figs.

47404 **Power conditioning subsystems for photovoltaic central-station power plants - technology and performance.** Krauthamer, S.; Das, R.; Bulawka, A. (California Institute of Technology, Pasadena; California State Univ., Long Beach; DOE, Washington, DC). pp 3.438-3.443 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

Central-station photovoltaic (PV) systems have the potential of economically displacing significant amounts of centrally generated electricity. However, the technical viability and, to some extent, the economic viability of central-station PV generation technology will depend upon the availability of large power conditioners that are efficient, safe, reliable, and economical. This paper is an overview of the technical and cost requirements that must be met to develop economically viable power conditioning subsystems (PCS) for central-station power plants. The paper also examines various already commercially available PCS hardware that may be suitable for use in today's central PV power stations. 10 references.

47405 **Status of utility-interactive photovoltaic power conditioning technology.** Key, T.S.; Krauthamer, S. (Sandia National Labs., Albuquerque, NM; California Institute of Technology, Pasadena). pp 3.444-3.449 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

Design options for utility-interactive photovoltaic power conditioning technology for unit ratings from 2kW to 5 MW are compared. Line- and self-commutated inverter designs for both single and three-phase applications are described. Efficiency, weight, and cost projections are provided for comparing the design options. New circuit designs that take advantage of advances in power semiconductor devices are found to be the most promising. Hardware efficiencies from 95 percent for single phase to 98 percent for three-phase applications are found. 7 references.

47406 **Microcomputer control of a residential photovoltaic power conditioning system.** Bose, B.K.; Szczesny, P.M.; Steigerwald, R.L. (General Electric Co., Corporate Research and Development, Schenectady, NY 12345). pp 852-859 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—).

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

Microcomputer-based control of a residential photovoltaic power conditioning system is described. The microcomputer is responsible for array current feedback control, maximum power tracking control, array safe zone steering control, phase-locked reference wave synthesis, sequencing control, and some diagnostics. The control functions are implemented using Intel 8751 single-chip microcomputer-based hardware and software. The controller has been tested in the laboratory with the prototype power conditioner and shows excellent performance.

1407 Solar Thermal Power Systems

REFER ALSO TO CITATION(S) 47403

47407 **(SAND—85-8184) Solar reformer experiment design study.** Rozenman, T. (Resource Analysis International, Inc., Los Angeles, CA (USA)). Jul 1986. Contract AC04-76DR00789. 93p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014744.

This report describes the design of an experiment in which solar energy is provided to a steam-hydrocarbon reforming reactor placed inside a solar central receiver. The hardware design, process, operation options with the possible critical issues are analyzed. Included also is the construction cost estimate and a development plan.

47408 **(SAND—86-8002) Total capital cost data base: 10MWe Solar Thermal Central Receiver Pilot Plant.** Norris, H.F. Jr. (Sandia National Labs., Livermore, CA (USA)). May 1986. Contract AC04-76DR00789. 118p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86011388.

This report describes the total capital cost data base of the 10 MWe Solar Thermal Central Receiver Pilot Plant. This Solar

One cost data base was created using the computer code "Cost Data Management System (CDMS)". The cost data base format was developed to be used as a common method of presentation of capital costs for power plants. The basic format is a plant system cost breakdown structure. Major accounts are land; structures and improvements; collector, receiver, thermal transport, thermal storage, and stream generation systems; turbine plant; electrical plant; miscellaneous plant systems and equipment; and plant-level indirect costs. Each major account includes subaccounts to as many as nine level of detail. The data base can be accessed to provide elements-of-work costs at any subaccount level or at the plant level. The elements-of-work include sitework/earthwork; concrete work; metal work; architectural; process equipment; piping; electrical; and miscellaneous work. Each of these elements-of-work can be or are broken into finer detail and costs can be accumulated to identify more specific needs, e.g., pipe insulation or heat exchangers. The cost data base can be accessed and various reports can be generated. These vary from a single page summary to detailed listings of costs and notes. Reported costs can be stated in dollars, dollars per kilowatt or percentage of the total plant cost. Reports or samples of reports for the pilot plant capital cost are included.

47409 **(SAND—86-8011) Utilizing spreadsheets for analyzing solar thermal central receiver power plant designs.** Norris, H.F., Jr. (Sandia National Labs., Livermore, CA (USA)). Jul 1986. Contract AC04-76DR00789. 73p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86013372.

Spreadsheets have been used to collect and understand existing solar thermal central receiver design data. Correlation of these data has led to the development of many useful algorithms. The algorithms provide the basis for calculating performance efficiencies, annual energy production, plant cost, and levelized energy cost. Variations in design details are evaluated with example results of the effect of plant location, collector field dield size, efficiencies for North and surround configurations as a function of field size, efficiencies of external and cavity receivers for similar operating conditions, and interactions of the collector field and receiver design. Examples are also presented for the plant total capital investment and levelized energy cost as a function of the annual energy produced. Sensitivities to various parameters affecting the net annual energy production and levelized energy cost are also discussed. The performance and cost characteristics of large and small plants are considered. Use of the spreadsheet analysis is demonstrated where one possible design utilizes modular solar systems. The design includes a single steam generator and turbine plant. This optimizes the performance and cost attributes of both small solar and large non-solar systems to arrive at a more cost-effective plant.

47410 **Advanced latent heat of fusion thermal energy storage for solar power systems.** Phillips, W.M.; Stearns, J.W. (California Institute of Technology, Pasadena). pp 2.384-2.391 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

The use of solar thermal power systems coupled with thermal energy storage (TES) is being studied for both terrestrial and space applications. In the case of terrestrial applications, it was found that one or two hours of TES could shift the insolation peak (solar noon) to coincide with user peak loads. The use of a phase change material (PCM) is attractive because of the higher energy storage density which can be achieved. However, the use of PCM has also certain disadvantages which must be addressed. Proof of concept testing was undertaken to evaluate corrosive effects and thermal ratcheting effects in a slurry system. It is concluded that the considered alkali metal/alkali salt slurry approach to TES appears to be very viable, taking into account an elimination of thermal ratcheting in storage systems and the reduction of corrosive effects. The approach appears to be useful for an employment involving temperatures applicable to Brayton or Stirling cycles. 6 references.

47411 **Numerical study of the performance of latent heat storage for solar dynamic power systems.** Solomon, A.D. (Oak Ridge National Lab., TN). pp 2.392-2.396 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

The structure and theoretical foundation of a simulation code for heat transfer and storage in an idealized storage module which forms part of a Brayton cycle solar power system are described. The underlying physical system is shown, and the advantages, drawbacks, and possible pitfalls of latent heat thermal energy storage are discussed. Some possible designs of a latent heat thermal energy storage module are examined. Preliminary results obtained by using analytical approximations which are crucial to homing in on potential system configurations are reported and examined using the simulation code. 20 references.

1408 Ocean Energy Systems

47412 **(AD-A—167702/0/XAB) Ocean thermal conversion (OTEC) project bottom cable protection study. Analysis and selection of protection techniques.** (Naval Facilities Engineering Command, Washington, DC (USA). Chesapeake Div.). Oct 1981. 84p. (CHES/NAVFAC-FPO—1-81(20)). NTIS MF A01.

General guidelines and procedures for cable protection are given for the four proposed Ocean Thermal Energy Conversion (OTEC) plant sites and cable routes, together with seafloor scenarios and protection strategies for each site. Burial of the cable below the seafloor is the recommended and best method of protecting OTEC cables from the hazards existing at all sites, namely, chafe and corrosion, hydrodynamic forces, trawler/dredge, and ship anchor. For landslides and earthquakes the only feasible method of protection, although limited, is to provide slack, in the cable, i.e. lay extra length. Trenches for burying the cable are recommended to be constructed a) by blasting through hard bottom at Hawaii for the first nautical mile (n.m.) and at Puerto Rico for the first 0.9 n.m; b)by a plowing machine at Hawaii for the next 0.5 n.m.; c) by a trenching machine at Guam for the first 0.55 n.m.; d) by a trenching /laying machine at Florida for 110 n.m.; and e) by a conventional floating dredge for 15 n.m. For the outshore segments of the cable routes it is recommenced to lay the cable on th seafloor because bottom sediments are soft enough to permit the cable to bury itself. Except for the Florida route, a normal cable laying vessel is recommended for laying the cable from plant site to landfall and for performing the protection details which are temie concrete cover over the cable at Hawaii for 0.5 n.m. and split pipe and rock anchor at Puerto Rico for 012 n.m.

47413 **(SERI/TP—253-2965) Potential of proposed open-cycle OTEC experiments to achieve net power.** Link, H.F.; Parsons, B.K. (Solar Energy Research Inst., Golden, CO (USA)). Jun 1986. Contract AC02-83CH10093. 8p. (CONF-860983—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010710.

From Oceans '86; Washington, DC, USA (23 Sep 1986).

Researchers at the Solar Energy Research Institute (SERI) conducted systems analysis studies to determine the potential of various experiments to produce net power using the Claude open-cycle ocean thermal energy conversion (OTEC) power system. The proposed experiment test site is to be the Natural Energy Laboratory of Hawaii at Keahole Point. We found that net power is unlikely to be produced in experiment sizes that use less than about 195 kg/s (3000 gpm) of cold water, and that flow rates of 420 kg/s (6500 gpm) are necessary to achieve a net-power production of at least one-half the gross-power output of the experiment.

47414 **Salinity driven oceanographic upwelling.** Johnson, D.H. (to Dept. of Energy, Washington, DC). US Patent 4,597,360. 1 Jul 1986. Filed date 30 Aug 1984. vp.

An upwelling device is described for mariculture comprising, a main duct having an elongated longitudinal wall portion, op-

posite end portions and a perforated cover plate at each opposite end portion, an interior space being defined in the main duct between the perforated cover plates, elongated flow segregating members supported in the interior space of the main duct and the flow segregating member having at least one end extending longitudinally beyond one of the perforated cover plates, a manifold plate for each end of the main duct, the manifold plate being spaced a predetermined amount from respective the cover plates at each end portion of the main duct, at least one of the manifold plates accommodating a longitudinally extending end of the flow segregating members, the predetermined space between the manifold plate and a respective the cover plate defining respective fluid flow paths.

47415 **System studies of open-cycle OTEC components.** Parsons, B.K.; Link, H.F. (Solar Energy Research Inst., 1617 Cole Boulevard, Golden, CO 80401). pp 1230-1239 of Ocean engineering and the environment (Conference record). Piscataway, NJ; IEEE Service Center (1985). (CONF-8511102—).

From Ocean '85; San Diego, CA, USA (12 Nov 1985).

A system model of open Rankine cycle ocean thermal energy conversion (OC-OTEC) was used to examine the effects of component performance and design on plant cost. Three components are examined in detail: an optional seawater deaeration subsystem, the flash evaporator, and a two-stage direct-contact condenser. Preliminary data quantifying noncondensable gas release in upcomers and a de-bubbler chamber were used to evaluate the effect of predeaeration (removing the dissolved gases in deaeration chambers before the seawater enters the heat exchangers) on system cost and performance. Little data on the interactions between geometry and performance of vertical spout flash evaporators operating under OTEC conditions are available; therefore, we performed independent parametric variations. For the direct-contact condenser previous numerical studies provide the basis for coupling geometry and performance. Results of these studies are useful in setting research priorities, in defining operating conditions for further seawater experiments, and in updating plant cost estimates.

47416 **Aquaculture using cold OTEC water.** Daniel, T.H. (The Natural Energy Lab. of Hawaii, P.O. Box 1749, Kailua-Kona, HI 96745). pp 1284-1289 of Ocean engineering and the environment (Conference record). Piscataway, NJ; IEEE Service Center (1985). (CONF-8511102—).

From Ocean '85; San Diego, CA, USA (12 Nov 1985).

The unique 2000 ft deep seawater pipeline installed at the Natural Energy Laboratory of Hawaii (NELH) supplies the only cold seawater available in large volumes anywhere in the tropics. Not only does the low temperature of the cold seawater required for the OTEC process permit the tropical culture of species normally found only in colder areas, it also allows inexpensive yet precise temperature control throughout even an open culture system. The deep water also contains high concentrations of the dissolved inorganic nutrients essential to plant growth, while the near total absence of pathogens, plants and particulates makes the water particularly well suited for the culture of sensitive organisms and also for the development of pure culture strains.

1409 Solar Thermal Utilization

REFER ALSO TO CITATION(S) 47857

47417 **(DOE/CS/30353—2) Security State Bank of Wells, Minnesota. Final technical report.** Weidt, J.L.; Hart, P.; Thorstenson, J. (Weidt (John) Associates, Inc., Minneapolis, MN (USA); Security State Bank, Wells, MN (USA); Hickey (Gene E.) and Associates, Inc., Edina, MN (USA)). 29 Jul 1986. Contract FC02-80CS30353. 48p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014711.

The goal of this project was to design and predict the energy performance of a passive solar building, to build and monitor the building, and to compare its actual performance with that predicted. The project was a success from the point of view of the design team; the owner, the architect and the solar designer. It amply illustrated the benefits of passive solar design to commercial buildings, and it clarified areas within which further research will be beneficial.

47418 **(ERC-R—86020A) Open-cycle absorption solar cooling. Part I. Combined heat and mass transfer on an open flow liquid absorbent solar collector/regenerator. Final report.** Novak, K.S.; Wood, B.D.; Nelson, D.J. (Arizona State Univ., Tempe (USA). Solar Energy Lab.). May 1986. Contract AC03-84SF12223. 321p. NTIS, PC A14/MF A01; 1; GPO Dep. File Number DE86014455.

Previous collector/regenerator models have relied on established heat transfer correlations and the heat and mass transfer analogy to specify heat and mass transfer coefficients. These correlations were derived from relatively simple experiments and do not account for the complexities inherent in the collector/regenerator heat and mass transfer problem. This research was prompted by the need for a more accurate performance model based on experimentally determined combined heat and mass transfer correlations. Experimental data were taken on a prototype (11 x 11 m) collector/regenerator during the summer of 1984 in Tempe, Arizona. The data taken included local solution temperature measurements on the collector but only inlet and exit concentration measurements. A solution energy balance was solved iteratively to determine local concentrations and local heat and mass transfer coefficients. A new collector/regenerator model, based on the derived correlations, accurately predicted actual experimental temperature and concentration data. The model was used to test the effects of various climatic, operational and collector design variables on evaporation rate.

47419 **(ERC-R—86020B) Open-cycle absorption solar cooling. Part II. Heat and mass transfer analysis for glazed collector/regeneration. Final report.** Nelson, D.J.; Wood, B.D.; Collier, R.K. (Arizona State Univ., Tempe (USA). Solar Energy Lab.; Enerscope, Inc., Glendale, AZ (USA)). May 1986. Contract AC03-84SF12223. 261p. NTIS, PC A12/MF A01; 1; GPO Dep. File Number DE86014456.

A two-dimensional analysis of steady laminar natural convection in an open ended parallel plate channel is presented for combined heat and mass transfer. Symmetric and asymmetric boundary conditions of uniform wall temperature and concentration (UWT/C) and uniform heat and mass flux (UH/MF) are considered for both aiding and opposing buoyancy due to mass transfer. The numerical method is then applied to model a glazed collector/regenerator component of an open-cycle solar absorption refrigeration system. The solution is coupled to an energy and mass balance on a thin film absorbent flow along one wall. The results indicate that the influence of glazing height is small if the flow is between the fully developed and single plate limits. The glazed collector/regenerator water evaporation rate is higher relative to the unglazed case because the reduction in convective and radiative heat losses increase the absorbent temperature and vapor pressure sufficiently to overcome the concomitant reduction in the mass transfer coefficient.

47420 **(ERC-R—86020C) Open-cycle absorption solar cooling. Part III. Evaluation of air-conditioning systems utilizing liquid absorbents regenerated by solar energy. Final report.** Siebe, D.A.; Wood, B.D.; Collier, R.K. (Arizona State Univ., Tempe (USA). Solar Energy Lab.; Enerscope, Inc., Glendale, AZ (USA)). May 1986. Contract AC03-84SF12223. 361p. NTIS, PC A16/MF A01; 1; GPO Dep. File Number DE86014457.

Previous open-cycle absorption modeling studies have been very limited and included only the solar collection part of the system. The purpose of this study was to evaluate the critical parameters necessary in order to have a viable system and to evaluate the potential for use of this type of system in various climatic regions of the United States. Thermodynamic property data were reviewed for several possible working solutions, analyzed to give predictive equations, and compiled into subprograms suited to system simulation work. The exergy concept was used to analyze the sources driving cooling systems. It was shown that an effectiveness based on exergy could be used as a thermodynamic common denominator to compare cooling systems using different driving sources, including those that utilize the evaporation of water to the atmosphere. Modeling of the absorber was used to show how an absorber, working with lithium chloride solution, would have to differ from an absorber, working with the lithium bromide solution

used in conventional closed absorption-refrigeration equipment. System simulations were done for five system design concepts.

47421 **(ERC-R—86020D) Phase I, open-cycle absorption solar cooling. Part IV. Executive summary analysis and resolution of critical issues and recommendations for Phase II. Final report.** Wood, B.D. (Arizona State Univ., Tempe (USA). Solar Energy Lab.). Jun 1986. Contract AC03-84SF12223. 91p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014458.

The objective of this project is to advance lower cost solar cooling technology with the feasibility analysis, design and evaluation of proof-of-concept open cycle solar cooling concepts. The work is divided into three phases, with planned completion of each phase before proceeding with the following phase: Phase I - performance/economic/environmental related analysis and exploratory studies; Phase II - design and construction of an experimental system, including evaluative testing; Phase III - extended system testing during operation and engineering modifications as required. For Phase I, analysis and resolution of critical issues were completed with the objective of developing design specifications for an improved prototype OCA system.

47422 **(NP—6770140) Passive solar heating systems applied in one-family houses - a study based on the requirements of Santiago de Chile.** Nielsen Gildemeister, S.H. (Stuttgart Univ. (Germany, F.R.). Fakultaet Architektur und Stadtplanung). 2 Jul 1984. 237p. (In German). NTIS (US Sales Only), PC A11/MF A01. File Number DE86770140.

The report abstracted aims at combining aspects of thermal comfort and physico-constructional knowledge. Residential building design is therefore based on energy concepts which apart from corresponding with climates and trends of energy conservation, also allows for the requirements of man. Assuming it to be ideally indicative of cultural requirements in terms of thermal comfort, the report exemplifies the one-family house. Theoretical discussion (part I) is followed by practical application to a specific, concrete case based on the requirements of Santiago de Chile. (BWI).

47423 **(SERI/TR—254-2841) Test results of immersed-coil heat exchangers and liquid storage tanks used in the packaged systems program.** Farrington, R.B. (Solar Energy Research Inst., Golden, CO (USA)). Jun 1986. Contract AC02-83CH10093. 70p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86010721.

The objective was to investigate the performance of and heat loss from laboratory prototypes of packaged active residential solar heating systems. The performance (effectiveness and overall heat transfer coefficient) of this type of heat exchanger varies with flow rate and the temperature difference between the storage tank and the inlet to the heat exchanger. This report discusses laboratory test results of the heat loss from three storage tanks and the performance of two immersed-coil heat exchangers. We tested a Honeywell domestic hot water heat exchanger that used a "collector-side" strategy, in which fluid is continually circulated through it to heat the storage tank, and a Trident heat exchanger that used a "load-side" strategy, in which fluid flows through the heat exchanger only on demand to meet the load. The collector-side heat exchanger performed very well at high temperature differentials and low flow rates. The load-side heat exchanger caused the tank to stratify with a very hot top layer that lagged behind the rest of the tank. We found that immersed heat exchangers perform better with reduced flow rates; that a load-side heat exchanger can be used with stratified storage tanks; and that both space heating storage tanks we tested failed under high-temperature conditions and had R-values much lower than expected.

47424 **Rapid solar-heated forced-air drying of large round hay bales: Design and operating considerations.** Bledsoe, B.L.; Hitch, J.W.; Maples, J.E.; Shoulders, S. St. Joseph, MI; American Society of Agricultural Engineers (1985). 18p. (CONF-851271—).

From American Society of Agricultural Engineers winter meeting: the world food situation - now and the year 2000; Chicago, IL, USA (17 Dec 1985).

Theoretical and experimental studies were made of high volume solar-heated airflow through large round hay bales for rapid drying. Design considerations in determining a suitable operating point for rapid drying are discussed with respect to matching bale system airflow resistance curves to fan curves. The effect of dry matter density and its distribution within the bale on airflow is shown, as is the effect of inlet and outlet geometry. Weaknesses in simulation of bale drying to date are discussed. Two areas of future research needs are identified.

47425 **Long-time solutions to heat-conduction transients with time-dependent inputs.** Ceylan, H.T.; Meyers, G.E. (Univ. of Wisconsin, Madison). *Journal of Heat Transfer;* 102: 111-116(Feb 1980). Contract AC03-80SF11508.

An economical method for obtaining long-time solutions to one, two, or three-dimensional heat-conduction transients with time-dependent forcing functions is presented. The conduction problem is spatially discretized by finite differences or by finite elements to obtain a system of first-order ordinary differential equations. The time-dependent input functions are each approximated by continuous, piecewise-linear functions each having the same uniform time interval. A set of response coefficients is generated by which a long-time solution can be carried out with a considerably lower cost than for conventional methods. The method has applications in problems of air-conditioning calculations for buildings and in the development of load models for solar energy studies.

1410 Solar Collectors And Concentrators

47426 **(BMFT-FB-T—86-014) Joint German-Argentine project: Comparative testing of solar flat plate collectors. Final report.** Leiner, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Bochum Univ. (Germany, F.R.). Inst. fuer Thermo- und Fluiddynamik). Jan 1986. 62p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752553.

Within a joint test program 6 different water or air collectors were tested in Argentina and in Germany. The tests were carried out by different institutions in different indoor and outdoor test facilities following ASHRAE standards and BSE guidelines. The test results vary considerably owing to differences in wind speed and global radiation, especially in the case of single-glazed collectors. In heating collectors, sensible leakages between ambient air and heat-transferring air may occur. The resulting errors of calculated efficiency may be greater than the relative change of mass flow from collector inlet to outlet by the leak. As a conclusion, several modifications of standardized test procedures are suggested. With 7 refs., 2 tabs., 22 figs.

47427 **(CONF-860655—14) Pathways toward a low cost evacuated collector system.** Hull, J.R.; Schertz, W.W.; Allen, J.W.; O'Gallagher, J.J.; Winston, R. (Argonne National Lab., IL (USA); Chicago Univ., IL (USA). Enrico Fermi Inst.). 1986. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014484.

From American Solar Energy Society annual meeting and 11. national passive solar conference; Boulder, CO, USA (8 Jun 1986).

The goal of widespread use of solar thermal collectors will only be achieved when they are proven to be economically superior to competing energy sources. Evacuated tubular collectors appear to have the potential to achieve this goal. An advanced evacuated collector using nonimaging concentration under development at the University of Chicago and Argonne can achieve a 50% seasonal efficiency at heat delivery temperatures in excess of 170°C. The same collector has an optical efficiency so that low temperature performance is also excellent. In this advanced collector design all of the critical components are enclosed in the vacuum, and the collector has an inherently long lifetime. The current cost of evacuated systems is too high, mainly because the volume of production has been too low to realize economies of mass production. It appears that certain design features of evacuated collectors can be changed (e.g., use of heat pipe absorbers) so as to introduce new system design and market strategy options that can reduce the balance of system cost.

47428 **(CONF-860655—15) Physical model of gradient zone erosion in thermohaline systems.** Hull, J.R.; Mehta, J.M. (Argonne National Lab., IL (USA); Illinois Inst. of Tech., Chicago (USA). Dept. of Mechanical Engineering). 1986. Contract W-31-109-ENG-38. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014488.

From American Solar Energy Society annual meeting and 11. national passive solar conference; Boulder, CO, USA (8 Jun 1986).

A model is formulated for gradient zone erosion in thermohaline systems. The model includes effects at gradient zone boundaries of mildly turbulent thermals in adjacent convecting zones. The model predicts microconvection within the gradient zone, with an amplitude that decays exponentially away from the boundaries. The predicted thickness of observable disturbance agrees with observation. Applying the theory to stability of the boundary yields erosion behavior that agrees with an empirical correlation for boundary equilibrium.

47429 **(DOE/SF/11930—1) Research on active solar processes. Final report.** (Wisconsin Univ., Madison (USA). Solar Energy Lab.). 15 May 1985. Contract AC03-83SF11930. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014824.

The research centers on the development of methods of simulation of solar processes (i.e., TRNSYS) and the use of those methods to study specific processes, prediction of their long-term performance, and their control. An analysis of flat-plate collectors with boiling fluids has resulted in the development of collector (plus condenser) models suitable for use in TRNSYS and for determining collector parameters for use in FCHART. Active system control strategy research has shown that operation of DHW systems at low collector flow rates can lead to significant improvements in system performance if tank stratification is maintained. Effects of time distribution of solar gains on building loads and thus on active system performance have been determined and corrections to FCHART predictions have been worked out. This has led to methods for calculating performance of hybrid systems based on utilizability concepts. During the contract period TRNSYS 12 was released; it includes new components and capabilities. A new FCHART 4.2 will be released in May and will include capability of estimating performance of hybrid systems, no-storage space heating systems, several types of passive systems and swimming pools.

47430 **(EPRI-AP—4608) Performance of the Vanguard Solar Dish-Stirling Engine Module. Final report.** Droher, J.J.; Squier, S.E. (Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center). Jul 1986. 224p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920415.

This report summarizes information on the performance of the Vanguard Parabolic Dish/Stirling Engine Module during an 18-month period of operational testing (February 1984 through July 1985) at Rancho Mirage, California. The test module consisted of a 10.7-m-diameter parabolic dish to collect and concentrate solar beam radiation, a solar receiver, a four-cylinder Stirling engine using hydrogen as the working gas, an induction generator, and an air-cooled radiator. Historical beam insolation data are summarized for the Palm Springs area. Gross and net output of electricity, auxiliary power requirements, system availability, and capacity factors are summarized on a monthly and annual basis. Models are presented for predicting electrical output. Operating and maintenance experience is delineated chronologically and by subsystem. The performance of each major subsystem is discussed. An assessment is made of the present and future status of the dish/Stirling system. Recommendations are made for future developmental work involving dish/Stirling applications for the utility industry.

47431 **(SERI/STR—253-2859) Wind load reduction for heliostats.** Peterka, J.A.; Hosoya, N.; Bienkiewicz, B.; Cermak, J.E. (Colorado State Univ., Fort Collins (USA)). May 1986. Contract AC02-83CH10093. 242p. NTIS, PC A11/MF A01; 1; GPO Dep. File Number DE86010703.

This report presents the results of wind-tunnel tests supported through the Solar Energy Research Institute (SERI) by the Office of Solar Thermal Technology of the US Department of Energy as part of the SERI research effort on innovative concentrators. As gravity loads on drive mechanisms are reduced through stretched-membrane technology, the wind-load contribution of the required drive capacity increases in percentage. Reduction of wind loads can provide economy in support structure and heliostat drive. Wind-tunnel tests have been directed at finding methods to reduce wind loads on heliostats. The tests investigated primarily the mean forces, moments, and the possibility of measuring fluctuating forces in anticipation of reducing those forces. A significant increase in ability to predict heliostat wind loads and their reduction within a heliostat field was achieved.

47432 **(SERI/TP—255-2995) Effect of the size of structural bulk inhomogeneities on the specular transmittance of polymer films.** Neidlinger, H.H. (Solar Energy Research Inst., Golden, CO (USA)). Jul 1986. Contract AC02-83CH10093. 8p. (CONF-860880—19). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010727.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

This paper will be confined to the effect of optical inhomogeneities in polymer films on the scattering or specular transmittance of light. Potential causes for the presence of scattering entities in the bulk phase of polymers will be discussed. It will be shown that practical transmittance measurements are greatly influenced by the angular width of the instrument receptor aperture. The choice of large receptor apertures will tend to include some of the scattering at small angles due to large inhomogeneities in the measurement of specular transmittance. As a consequence, the transmittance measured is not necessarily increased by reducing the size of the inhomogeneities in the polymer films, but there is a critical size when the specular transmittance is a minimum.

1420 Heat Storage

47433 **(DOE/SF/11936—T1) High-temperature composite thermal energy storage for solar applications. Draft. Final report.** Ong, E.T.; Petri, R.J.; Erickson, D.S. (Institute of Gas Technology, Chicago, IL (USA)). Jan 1986. Contract AC03-83SF11936. 59p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014161.

The objective of this program was to evaluate and screen concepts of applying direct-contact, sensible/latent heat storage media to the very high temperature regimes of high-efficiency solar power generation and solar chemicals/fuels and process heat.

15 GEOTHERMAL ENERGY

1501 Resource Status And Assessment

47434 **(LA—10634-MS) Geology of the platanares geothermal site, Departamento de Copan, Honduras, Central America. Field report.** Heiken, G.; Eppler, D.; Wohletz, K.; Flores, W.; Ramos, N.; Ritchie, A. (Los Alamos National Lab., NM (USA)). May 1986. Contract W-7405-ENG-36. 69p. (In Spanish and English). NTIS, PC A04/MF A01; GPO Dep. File Number DE86013629.

Platanares is located 16 km west of Santa Rosa de Copan, Honduras, along the Quebrada del Agua Caliente. The thermal manifestations are along faults in tuffs, tuffaceous sedimentary rocks, and lavas of the Padre Miguel Group. These tuffs are silicified near the faults, are fractured, and may provide the fracture permeability necessary for the hydrothermal system. Tuffs are overlain by a wedge of terrace gravels up to 60 m thick. Quaternary conglomerates of the Quebrada del Agua Caliente are cemented by silica sinter. The Platanares area contains numerous faults, all of which appear to be extensional. There are four groups of faults (N80°E to N70°W, N30° to 60°W, N40° to 65°E, and N00° to 05°W). All hot springs at this site are located along faults that trend mostly northwest and north. Twenty-eight spring groups were described over an area of 0.2 km^2; half were boiling. Based on surface temperatures and flow rates, between 0.7 and 1.0 MW thermal energy is estimated for the area. The increased temperature of the stream flowing through the thermal area indicates that several

megawatts of thermal energy are being added to the stream. We recommend that a dipole-dipole resistivity line be run along the Quebrada del Agua Caliente to identify zones of fracture permeability associated with buried faults and hot water reservoirs within those fault zones. A thermal gradient corehole should be drilled at Platanares to test temperatures, lithologies, and permeability of the hydrothermal system.

47435 **(LA-UR—86-2009) Geothermal initiatives in Central America.** Hanold, R.J.; Loose, V.W.; Laughlin, A.W.; Wade, P.E. (Los Alamos National Lab., NM (USA); Air Force Academy, CO (USA)). 1986. Contract W-7405-ENG-36. 6p. (CONF-860926—9). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012374.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

The US Agency for International Development is supporting a new project in energy and resources exploitation for Central America. One of the largest components of the project involves exploration and reservoir development investigations directed at enhancing the production of electricity from the region's geothermal resources. An assessment of the geothermal resources of Honduras is in progress, and interesting geothermal regions in the Guanacaste Province of Costa Rica are being explored. Well-logging activities are in progress in the production wells at the Miravalles geothermal field in Costa Rica, and preparations are being made for logging critical wells at Ahuachapan in El Salvador. A self-contained logging truck, complete with high-temperature logging cable and logging tools designed for geothermal service, is being fabricated and will be made available for dedicated use throughout Central America. Geochemical and isotopic analyses of water samples collected in Panama are being evaluated to select a high-priority geothermal site in that country. Application of low- and medium-enthalpy geothermal fluids for industrial and agricultural processes is being investigated in Guatemala.

1502 Geology And Hydrology Of Geothermal Systems

REFER ALSO TO CITATION(S) 47434, 48932

1503 Geothermal Exploration And Exploration Technology

REFER ALSO TO CITATION(S) 47435

47436 **(LA-UR—86-1404) Hydrogeochemistry and preliminary reservoir model of the Platanares Geothermal System, Honduras, Central America.** Goff, F.; Shevenell, L.; Janik, C.J.; Truesdell, A.H.; Grigsby, C.O.; Paredes, R. (Los Alamos National Lab., NM (USA); Geological Survey, Menlo Park, CA (USA)). 1986. Contract W-7405-ENG-36. 7p. (CONF-860926—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010198.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

A detailed hydrogeochemical investigation has been performed at Platanares, Honduras in preparation for shallow geothermal exploration drilling. Platanares is not associated with any Quaternary volcanism but lies in a tectonic zone of late Tertiary to Quaternary extension. Thermal fluids are characterized by pH between 7 and 10, $Cl < 40$ mg/l, $HCO_3 > SO_4 > Cl$, $B \leq 17$ mg/l, $Li \leq 4$ mg/l and $As \leq 1.25$ mg/l. Various geochemical indicators show that mixing of hot and cold end-member fluids is an important hydrologic process at this site. Geothermometers indicate the geothermal system equilibrated at roughly 225°C while trace element chemistry indicates the reservoir resides in Cretaceous red beds of the Valle de Angeles Group. Based on the discharge rates of thermal features, the minimum power output of the Platanares geothermal site is about 45 MW (thermal).

47437 **(LBL—21727) Computerized data acquisition system for production, injection and interference tests.** Benson, S.M. (Lawrence Berkeley Lab., CA (USA)). Jun 1986. Contract AC03-76SF00098. 10p. (CONF-860926—10). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013473.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

A computer-based system for collecting, processing, and analyzing pressure transient data has been developed. Primary components include downhole pressure sensors, linedrivers, a microcomputer, data storage disk, scanner, frequency counter, digital voltmeter, power supply, graphics plotter, and printer. In-field data processing and analysis greatly aid in handling the large volume of data that are collected during pressure transients tests, particularly the multiwell interference tests that are so important for characterizing and assessing geothermal reservoirs. In-field data processing provides the field engineer, on a real-time basis, with the information needed to make decisions regarding test parameters and duration. The system has been used on numerous occasions and has proved itself to be reliable under the harsh operating conditions that are usually encountered in the field. This paper describes the advantages of using this type of system for collecting data, the components and configuration of the system, and the software programs used to collect and process the data. Finally, two field applications are presented.

47438 **(SAND—86-1126C) Battery pack/controller for high temperature applications.** Wolfenbarger, F.M. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 6p. (CONF-860926—8). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011656.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

At temperatures in excess of 300°C, standard conductive wirelines cannot be used for signal or power transmission in geothermal wells. At such temperatures, a mechanical slickline can be used to raise and lower instrumentation, but the instrumentation control and power must then be self contained. This paper reviews the development of a battery and timing circuit to control a motor in a Los Alamos National Laboratory sampling tool. The battery pack-controller circuitry enclosed in a dewar was used in the Salton Sea Scientific Drilling Project (SSSDP) for temperatures approaching 400°C.

47439 **(SAND—86-1127C) Development of downhole instruments for use in the Salton Sea Scientific Drilling Project.** Carson, C.C. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 5p. (CONF-860926—7). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011421.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

Sandia developed high temperature logging instruments for use in the Salton Sea Scientific Drilling Project. These tools - Kuster mechanical tools for measuring temperature, pressure, and flow; a temperature and pressure tool built around an electronic memory; and a timing and control unit to power a downhole sampler - were all designed for slickline operation to temperatures up to 400°C. The drilling of the scientific well and the application of these tools in it were successful. The technology advances made in the development of these tools have been transferred to industry. These advances should prove valuable in future scientific and commercial applications.

1508 Geothermal Power Plants

47440 **(EGG-M—10286) Overview of recent supercritical binary geothermal cycle experiments from the Heat Cycle Research Program.** Demuth, O.J.; Bliem, C.J.; Mines, G.L.; Swank, W.D. (Idaho National Engineering Lab., Idaho Falls (USA)). 1986. Contract AC07-76ID01570. 6p. (CONF-860926—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011048.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

The Heat Cycle Research Program, which is being conducted for the Department of Energy, has as its objective the development of the technology for effecting improved utilization of moderate temperature geothermal resources. Testing at the Heat Cycle Research Facility located at the DOE Geothermal Test Facility East Mesa, California involves supercritical vaporization and counterflow in-tube condensing in an organic Rankine cycle. Results of the experiments are given for both pure and mixed-hydrocarbon working fluids. The heater and condenser behavior predicted by the Heat Transfer Research, Inc. computer codes used for correlation of the data was in excellent agreement with experimental results. A special series of tests, conducted with propane and up to approximately 40% isopentane concentration, indicated that a close approach to "integral" condensation was occurring in the vertically-oriented condenser. Preliminary results of tests in which the turbine expansion "passed through the two-phase region" did not indicate efficiency degradation assignable to these metastable expansion processes.

1509 Geothermal Engineering

REFER ALSO TO CITATION(S) 47438, 47445

47441 **(SAND—85-2809) High energy gas fracture experiments in liquid-filled boreholes: potential geothermal application.** Cuderman, J.F.; Chu, T.Y.; Jung, J.; Jacobson, R.D. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1986. Contract AC04-76DP00789. 77p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014934.

High Energy Gas Fracturing is a tailored pulse fracturing technique which uses propellants to obtain controlled fracture initiation and extension. Borehole pressurization rates can be tailored, by suitable choice of propellants, to produce four or eight fractures radiating from the wellbore. High Energy Gas Fracture (HEGF) research is conducted at DOE's Nevada Test Site (NTS) in a tunnel complex where experiments can be done under realistic in situ stress conditions (1400 psi (9.7 MPa) overburden stress). Pressure measurements are made in the test borehole during all fracturing experiments. Experiments are mined back to provide direct observation of fracturing obtained. The initial objective of HEGF research was to develop multiple fracturing technology for application in gas well stimulation. HEGF research at NTS and in Devonian shale demonstration tests has resulted in a completed technology for multiple fracturing in uncased, liquid-free wellbores. Current research is directed toward extending the technique to liquid-filled boreholes for application in geothermal in addition to gas and oil wells. For liquid-free boreholes, multiple fracturing is specified in terms of pressure risetime required for a given borehole diameter. Propellants are mixed to achieve the desired risetime using a semiempirical mixing equation. The same techniques were successfully applied to fracturing in liquid-filled wellbores. However, the addition of liquid in the borehole results in a significantly more complicated fracturing behavior. Hydrodynamic effects are significant. Multiple fractures are initiated but only some propagated. Multiple- and hydraulic-type fracturing and wellbore crushing have been observed in the same experiment. The potential of using HEGB for geothermal well stimulation has been demonstrated through the present experiments. 18 refs., 40 figs., 4 tabs.

47442 **(SAND—86-1120C) Evaluating candidate lost circulation materials for geothermal drilling.** Loeppke, G. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 7p. (CONF-860926—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010999.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

Sandia National Laboratories' Geothermal Technology Development Division is working to advance the state of the art of lost circulation prevention and control. For this purpose, a large-scale lost Circulation Test Facility was designed and built. This paper addresses the evaluation of candidate lost circulation material using this facility and also using the recommended practice of API RP 131. Test results from these facilities are compared and discussed for the materials tested.

47443 **(SAND—86-1128C) Drilling fluid temperatures in a magma - penetrating wellbore.** Finger, J.T. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 5p. (CONF-860926—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011184.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

This paper describes the numerical modeling of the drilling fluid temperatures in a deep well that penetrates a magma body. The basic assumptions for the model are listed, the importance of the fluid temperature is considered, and the effect of changing the model parameters is assessed. The stratigraphy and formation temperature profile assumed for this hypothetical well are similar to Long Valley, CA, where a relatively shallow magma body is believed to exist. A major result of this modeling is demonstration of the benefit of insulated drillpipe.

47444 **(SAND—86-2023C) Geochemistry and materials studies in support of the Magma Energy Extraction Program.** Westrich, H.R.; Weirick, L.J. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 5p. (CONF-860926—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010997.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

Geochemistry and materials studies are being performed in support of the Magma Energy Extraction Program. The scope of the studies is dictated by the sites under consideration and the designs of the drilling and energy extraction systems. The work has been largely restricted to characterizing magmatic environments at sites of interest and testing engineering materials in laboratory simulated rhyolite magmatic environments. The behavior of 17 commercially available materials has been examined at magmatic conditions. Analysis of reaction products reveal that oxidation, and not sulfidation, is the main corrosion problem for most alloys in rhyolite, and that reaction with other magmatic components is limited. Considerations of corrosion resistance, high-temperature strength, and cost indicate nickel-base superalloys offer the most promise as candidates for use in rhyolitic magma.

1520 Geothermal Data And Theory

47445 **(BNL—38019) Effects of carbon dioxide attack on geothermal cement grouts.** Milestone, N.B.; Kukacka, L.E.; Carciello, N. (Brookhaven National Lab., Upton, NY (USA); Department of Scientific and Industrial Research, Petone (New Zealand). Chemistry Div.). Mar 1986. Contract AC02-76CH00016. 12p. (CONF-860926—11). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013919.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

Studies of carbonation of geotheirmal grouts have shown that the physical criteria recommended by the American Petroleum Institute do not apply for durability in CO_2-containing fluids. The high silica binders, normally considered desirable because of their high strengths and low permeability, become permeable when carbonated. This allows further attack on the grout, and if the fluids are undersaturated with $CaCO_3$, then rapid corrosion will occur. On the other hand, grouts which contain appreciable amounts of calcium hydroxide have proved the most durable in CO_2-containing fluids despite their low strengths and high permeability. This is due to an impermeable layer of calcium carbonate which forms on the outside of the sample preventing further penetration of reactant species. Unless this layer is corroded, no further attack occurs.

47446 **(DOE/SF/11682—T1) Model of gypsum, calcite and silica solubilities for application to geothermal waters over a wide range of temperature, P/sub CO_2/ and ionic strength. Final technical report, October 1, 1983-September 30, 1984.** (California Univ., Berkeley (USA)). 1984. Contract AT03-82SF11682. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014018.

This report describes the construction of a high temperature (25 to 250°C), variable P/sub CO_2/ (1 to 40 atm), chemical model of mineral (including gypsum, calcite and amorphous silica) solubi-

lities in the system: Na-K-Ca-H-Cl-SO_4-HCO_3-CO_3-CO_2-SiO_2-H_2O. This model was designed to support geothermal energy production needs.

47447 **(UT/CES-GR—5) Hydrocarbon solubility and its migration processes: a look at the present status.** Mamun, C.K.; Ohkuma, H.; Sepehrnoori, K. (Texas Univ., Austin (USA). Center for Energy Studies). Dec 1985. Contract FC07-85NV10412. 131p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86013323.

In this study we review the present status of knowledge of solubility of hydrocarbons and its implications on primary migration processes. The intent is to examine the solubility and the transportation mechanisms relevant to geopressured-geothermal reservoirs, although the discussion included here accommodates a wide range of related aspects. Influences of parameters associated with hydrocarbon (especially methane) solubility have been studied. We have sought to evaluate several primary hydrocarbon migration processes and to point out their attractive features as well as their limitations. A brief discussion of hydrocarbon generation processes is also included.

47448 **Thermal expansion and cracking of three confined, water-saturated igneous rocks to 800°C.** Bauer, S.J.; Handin, J. (Texas A & M Univ., College Station). **16**: 181-198(1983). Contract AS05-79ER10361.

The thermal expansions of water-saturated Charcoal Granite, Mt. Hood Andesite, and Cuerbio Basalt were measured at effective confining pressures of 5, 50, and 100 MPa to 800°C. The mean coefficient of linear thermal expansion is a function of lithology, pressure, temperature, and initial porosity. The coefficient for the Charcoal Granite increases with temperature at all pressures. For the andesite at 5 MPa, it increases from 200 to 400°C, then decreases gradually to 800°C. At 50 MPa, the coefficient decreases slightly from 100 to 200°C, then increases at a low rate to 600°C. The basalt, however, has an essentially constant coefficient for temperatures less than 150°C at lower pressure and shows but a small increase from 100 to 800°C t 50 MPa. The difference between measured values of thermal expansion and those calculated from simple mixture-theory relates to new crack porosity generated as a result of differential thermal expansion at the anisotropic grain scale. For the granite, a two to three order of magnitude increase in permeability is predicted. The results have significance with respect to engineering problems of very deep drilling, geothermal energy production, and nuclear-waste isolation.

17 WIND ENERGY

1701 Availability (climatology)

47449 **(DOE/CH/10206—T1) Evaluating the impacts of an incomplete data set on estimating the wind power potential. Final report.** Baker, R.W.; Chu, P.S. (Oregon State Univ., Corvallis (USA). Wind Resources Assessment Lab.). Sep 1984. Contract FG02-84CH10206. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86011920.

To properly evaluate the wind power potential of a site an accurate and complete data set of preferably several years length are needed. Hourly wind speed and direction data are also preferred so a detailed analysis can be done of the important wind characteristics. However, collecting a complete hourly data set over a one year period is a formidable task. Maintaining and keeping wind sensors operational on an hourly basis are often difficult and as a result data records are often incomplete. Typically, on an annual basis data recovery is from 75 to 90%. The objective of this research is to evaluate the impact of missing data on the estimation of wind power resource statistics. These statistics include the monthly, seasonal, and annual mean wind speed, mean power density, and estimated wind turbine generator (WTG) energy output.

47450 **(NMRDI—2-73-4220) New Mexico anemometer loan program. Final report.** Stokes, K. (New Mexico State Univ., Las Cruces (USA). New Mexico Solar Energy Inst.). Jun 1986. 81p. NTIS, PC A05/MF A01 - NMERDI, Univ. of New Mexico, 457 Washington, S.E., Albuquerque, NM 87108. File Number DE86901583.

The New Mexico Solar Energy Institute has concluded monitoring 30 anemometer systems which were installed throughout the state. Wind resource data have been collected and analyzed for the period April 1985 through March 1986. The primary results are: average monthly and yearly wind speeds are reported for 28 sites where no wind record existed previously; two sites (Vado and Carrizozo) demonstrated a 12 mph average at a 30 foot tower height; and extrapolating annual wind speeds to 80 foot tower heights indicates nearly 12 mph averages are possible for seven additional sites (Las Cruces, Roy, Encino, Clovis, Springer, Carlsbad, and Vaughn).

1704 Economics

47451 **(CWD—4-3) Cost of windmill irrigation. Cost analysis of wind pumps and diesel pumps used for small scale irrigation.** Mueller, A.M.; Jansen, A.M. (Consultancy Services Wind Energy Developing Countries, Amersfoort (Netherlands)). Jun 1984. 15p. NTIS, PC A02/MF A01.

A cost analysis and a method to make a quick economic comparison between wind pumps (water-pumping windmills) and diesel pumps (diesel powered water pumps) intended for use in small-scale lift irrigation are described. The analysis compares CWD wind pumps, designed for production in developing countries, with commercially available, traditional multiblade wind pumps. The variables required for comparison are: static lift, daily water requirement, and average wind speed during the period of irrigation. The analysis shows that for farmers engaged in small-scale lift irrigation on areas of up to 1 ha (2.5 acres), CWD wind pumps are economically more attractive than diesel pumps for average wind speeds during the irrigation season of 3.5 m/sec (7.8 mph). Commercial wind pumps are more attractive than diesel pumps for an average wind speed of 4.5 m/sec (10.1 mph).

47452 **(DOE/BP/11191—9) Cape Blanco Wind Farm feasibility study. Technical Report No. 9. Socioeconomics.** Cunningham, E.S. (Enviroshpere Co., Bellevue, WA (USA)). Apr 1986. Contract AC79-83BP11191. 26p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86012860.

The socioeconomic impacts of a proposed wind farm at Cape Blanco, Oregon were assessed within the context of Curry County and, more specifically, Port Orford. The proposed 80-MW wind farm consists of installing either 455 units of FloWind 170-kW turbines or 31 units of Boeing MOD-2 turbines. Positive impacts are expected to occur during the on-year construction period. Local workers are expected to fill approximately 45 jobs for the Boeing alternative and 155 for the FloWind. The expenditures of nonlocal construction workers, estimated at $2.6 million (1984 dollars) for the Boeing and at $0.5 million (1984 dollars) for the FloWind, would contribute to increased revenues in the trade and services sectors of Port Orford. The construction workers for the FloWind alternative are expected to use primarily motels and trailer parks for their housing accommodations. Since there could be a shortage of temporary housing, particularly during the summer months, rental housing might need to be used. The demand for temporary housing, however, is not expected to displace tourists. If the Boeing alternative were selected, the construction contractor might need to provide worker housing to alleviate the demand for housing in Port Orford.

1705 Environmental Aspects

47453 **(DOE/BP/11191—8) Cape Blanco Wind Farm feasibility study. Technical Report No. 8. Land use.** Blair, W.G.E. (Jones and Jones, Seattle, WA (USA)). Apr 1986. Contract AC79-83BP11191. 59p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86012911.

The land-use impacts of a proposed wind farm near Cape Blanco and Port Orford, Oregon, were assessed within the context of Curry County. Potential land-use impacts that could occur at other wind farm locations along the Oregon coast were also identified. The primary alternatives for the wind farm comprised (1) 31 Boeing MOD-2 horizontal-axis wind turbines and (2) 455 FloWind 170 vetical-axis wind turbines. A third alternative, consisting of 259 DAF 500 vetical-axis wind turbines was examined in less detail. As proposed, the construction of wind machine foundations and permanent gravel roads for the three alternative would lead to the irreversible loss of 29 to 57 acres of prime farmlands. These losses could be considerably reduced for the FlowWind and DAF alternatives by revising the proposed designs of the site access roads and the machine foundations. Because of the limited acreage involved, the author has judges the loss of prime farmlands not to be a significant adverse environmental impact in terms of the National Environmental Policy Act. An analysis of the impact of farmland conversion in terms of the Farmland Protection Policy Act will be made by the Soil Conservation Service (SCS), if and when a specific development plan for the wind farm is submitted to the agency. This analysis would be required if the wind farm would involve federal assistance other than permitting or licensing activities.

47454 (DOE/BP/11191—10) Cape Blanco Wind Farm feasibility study. Technical Report No. 10. Cultural resources. (USDOE Bonneville Power Administration, Portland, OR). Apr 1986. Contract AC79-83BP11191. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86012863.

The objective of the cultural resources study was to: (1) identify significant archeological and historic sites, cultural resources, within the area of the Cape Blanco Wind Farm's potential environmental impact; (2) identify potential impacts of the project on identified cultural resources; and (3) develop measures to mitigate or minimize impacts. Cultural properties discussed in the following sections of the cultural resources study were identified in the Port Orford Cultural Resources survey and Inventory (HSPP No. 8307), May 1984, and the National registor of Historic Places, and in consultation with the State Historic Preservation Officer. An intensive field survey of the project area was also conducted. Although no cultural properties were identified during the field survey, several historic properties were located offsite that would be affected to varying degrees by the presence of generating machinery on the wind farm. Construction of neither of the transmission line alternatives would have an adverse effect on cultural properties because the line would not be visible from them.

47455 (EPRI-AP—4591) Utility considerations for wind energy purchase agreements. Final report. Lynette, R. (Lynette (R.) and Associates, Inc., Redmond, WA (USA)). Jun 1986. 65p. Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303. File Number TI86920367.

Utility purchases of electric energy from privately owned wind power stations have led to the development of a number of alternative purchase agreements. Many of these agreements involve a commitment by the involved utility to purchase energy at long-term levelized prices, or at prices other than the normal short-run avoided costs. The objective of such agreements is to encourage the private development of nonconventional energy sources. This can be beneficial to certain utilities by reducing their needs to invest in additional energy production facilities. Energy purchase agreements that provide for energy payments at prices other than short-term avoided costs can result in unresolved financial obligations if the station owner defaults and does not complete the terms of the agreement. The potential exposure to the utility can be estimated and eliminated by a variety of methods, such as equipment liens and performance bonds. This report provides an analysis of such agreements, identifies the critical parameters, and establishes boundary conditions for the parameters.

1706 Wind Energy Engineering

REFER ALSO TO CITATION(S) 47403, 47453

47456 (CERL-TPRD/L—2829/N85) Prediction of extreme offshore wind speeds at moderate elevations using upper-level wind data . Moore, D.J.; Bennett, M. (Central Electricity Research Labs., Leatherhead (UK)). Aug 1985. 13p. British Library, Boston Spa, Wetherby, West Yorks .

In the design and operation of wind turbines, it is clearly of great economic importance to know accurately the frequency with which machines will be subject to severe winds. There are two aspects to the problem. The question of most importance is the speed of the strongest gust which is likely to be experienced over the design lifetime of the wind turbine. Secondly comes the problem of knowing the annual number of hours generation lost per year because conditions are too severe for safe generation. Both questions are examined in the light of radiosonde data from UK stations in the periods 1961-1970 and 1971-1980.

47457 (DOE/AL/21362—T1) Uncertainties in the aerodynamics and structural dynamics of rotors suitable for reliable and long life operation of small HAWTS. Jones, J.L.; Harper, C.W.; Ashley, H.; Bisplinghoff, R.L.; Eggers, A.J. Jr. (RANN, Inc., Palo Alto, CA (USA)). Dec 1984. Contract AC04-82AL21362. 198p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE86010592.

This study was undertaken to identify theoretical and experimental knowledge available and required to achieve reliable and long life operation of small horizontal axis wind turbine systems (SHAWTS) in utility applications. This class of HAWTS has been taken to range from 8 to 280 kW at the present time, with corresponding rotor diameters ranging from about 30 to 125 ft. There is a trend toward higher power machines, achieved with smaller diameter rotors operated at higher RPM and rated wind velocity, compared to the DOE/NASA MOD-0 and MOD-0A units. Because of the smaller diameter of SHAWTS relative to LHAWTS rotors, the former tend to operate with smaller unsteady loads from non-uniform inflow velocity profiles and from atmospheric gusts and turbulence. But because of the higher RPM of SHAWTS, the frequencies of the unsteady loads are higher. Finally because of their smaller blades, they are relatively stiffer, and on balance it appears that unsteady loads may more often be of less consequence than limit loads in blade structural design for SHAWTS. There are indications, however, that yaw dynamics in gusty and/or high velocity winds may be a critical fatigue design factor for free yaw SHAWTS rotor blades. There is a plethora of SHAWTS design concepts; however, many utilize downwind, stall controlled, free yaw rotors.

47458 (DOE/BP/11191—5) Cape Blanco Wind Farm feasibility study. Technical Report No. 5. Communications interference. Sengupta, D.L. (Michigan Univ., Ann Arbor (USA). Dept. of Electrical Engineering and Computer Science; Burns and McDonnell Engineering Co., Kansas City, MO (USA)). Apr 1986. Contract AC79-83BP11191. 29p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86012925.

The potential interference effects of the proposed Cape Blanco Wind Farm on the performance of various electromagnetic communications systems in its vicinity have been assessed from a teoretical standpoint. The assessment was carried out by assuming that the wind farm could involve 455 units of FloWind 170 kW, 31 units of Boeing MOD-2, or 259 units of DAF 6400 turbines. The systems that were assessed include navigation, microwave links and ratio, AM and FM broadcast reception, and television reception. The electromagnetic interference assessment was conducted on the basis of known criteria. The results of the study indicate that the navigation systems located at Cape Blanco would not be significantly affected by any of the three cnadidate wind turbines. If the radio systems are used as links, it would be unlikely that their performance would be adversely affected by the vertical-axis wind turbines (VAWTs). However, a more detailed evaluation should be carried out before deciding on the actual distribution of the MOD-2 turbines. If the miscellaneous radio systems were used for area

communication, their performance within and in the immediate vicinity of the wind farm could be affected adversely. AM and FM broadcast reception outside the wind farm should not be affected significantly; within the wind farm site, the reception within a few rotor diameters of an individual wind turbine could be affected adversely. With regard to the effect on television, reception from a satellite dish antenna in the vicinity of the site was included in the assessment. Use of either of the two VAWTs could produce slight effects at the nearby residence. The effects would be strong and unacceptable with the MOD-2 turbines, requiring further studies to determine more accurately the impacts.

47459 **(DOE/NASA—0005-3) Application of a personal computer for the uncoupled vibration analysis of wind turbine blade and counterweight assemblies.** White, P.R.; Little, R.R. (Toledo Univ., OH (USA)). Dec 1985. Contract AI01-76ET20320. 143p. (NASA-CR—175090). NTIS, PC A07/MF A01. File Number TI86013617.

Section 2 of this report describes the theory used in calculating the natural frequencies and mode shapes. The theory is based upon a lumped mass formulation for the blade and counterweight assemblies. It is this theory which forms the basis for the development of the computer codes which ultimately generate the analytical results. Section 3 describes the computer codes developed and documents how the theory is implemented in the codes. The discussion of each code includes the input and output data structures used. The codes are designed to be as general as possible so that other designs can be readily analyzed. The input for the codes are generally interactive to facilitate usage. The actual code listings are included in the Appendix. Section 4 describes the operation and use of the computer codes. Section 4 also includes an example which demonstrates the application of the computer software. Section 5 describes the actual results of the analysis of the MOD-O blade and counterweight assemblies at various operational speeds and includes a discussion of the analytical and experimental results.

47460 **(DOE/R0/00484—T1) Port Townsend wind energy demonstration project. Project report.** Ross, L. (Port Townsend, City of, OR (USA)). 15 Dec 1984. Contract FG06-80R000484. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86012979.

A wind generator was used to demonstrate the use of wind energy on the campus of the Port Townsend High School. Through this project, enough data was collected to make a realistic evaluation of small wind projects. (BCS)

47461 **(DOE/R0/01242—T1) [Wind-powered generators. Final report].** Beck, W. (Beck (William), Pullman, WA (USA)). 15 Sep 1984. Contract FG06-81R001242. 10p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013098.

This report is the result of the collection of data concerning the operation and economics of a wind electric generator at my home near Pullman, Washington. The wind velocity was monitored and recorded. This report contains information collected at two different sites and from both a 10kW utility interconnected wind electric generator and from a 1.8kW dc wind electric generator. This became necessary due to problems with the interconnection of the 10kW generator to my utility grid.

47462 **(DOE/RA/50664—1) Integration methodology for large wind-energy conversion systems. Final report.** Thomas, R.J. (Cornell Univ., Ithaca, NY (USA). School of Electrical Engineering). Jun 1986. Contract AC02-81RA50664. 117p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86012872.

This report addresses a variety of problems associated with integrating large numbers of large wind turbine generators into an electric utility system. The report begins with statements of problem definition and background. We develop a technique for extrapolating a few spatial measurements (many measurements in time) to large numbers of spatially correlated time functions suitable for exercising individual and aggregate systems. An AC/DC/AC interface provides the most suitable mechanism for integration of large numbers of wind generating from the viewpoint of economics, steady-state and dynamic control, and protection. This leads naturally to the use of a variable-speed wind turbine. The interface can accommodate a fixed speed machine if there is reason to do so. We discuss the specific control system design for a variable-speed turbine and suggest a new variable speed generation mechanism, a controllable induction machine. The report then discusses the steady-state behavior of the wind farm in terms of control and scheduling of power flow, harmonics, and VAR requirements. A special wind farm load-flow program was developed for this study. Further study was performed from the power system point of view and in terms of voltage and VAR support requirements necessary to operate the farm. It is shown that with proper control the wind farm can enhance rather than degrade the system voltage profile. In addition, the same control mechamisms are useful for damping system transient oscillations caused by system disturbances. The last two chapters deal with wind farm protection and operation economics. It is shown in the final chapter that if the farm is properly operated that significant penetration can be achieved and that a marginal cost can be obtained that is consistent with economic dispatch.

47463 **(EPRI-AP—4528) Cost estimates for vertical-axis wind turbines. Final report.** Campbell, L.J.; Lessley, R.L. (Bechtel Group, Inc., San Francisco, CA (USA)). May 1986. 255p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920265.

Several conceptual designs of complete wind power plants were developed, and estimates of energy capture, capital cost, operating and maintenance cost, and cost of electricity were prepared. Two vertical-axis wind turbine designs were considered: the 500 kW DAF Indal Series 6400 and the 170 kW FloWind Model 170. Small cluster installations of 3.4 MW to 5.2 MW and large cluster installations of 85 MW to 130 MW were designed. The performance of each turbine was evaluated for four specific wind regimes, and the small and large cluster layouts were optimized for the baseline Amarillo, Texas, wind regime. Cost estimates were based upon existing production methods and capacities and upon higher production levels of 400 to 1000 units per year over a period of five years.

47464 **(EPRI-AP—4586) Wind power instrumentation directory. Final report.** Lynette, R. (Lynette (R.) and Associates, Inc., Redmond, WA (USA)). May 1986. 80p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920304.

A directory of wind resource and wind turbine performance measurement equipment and software is presented. Wind resource characteristics and wind turbine performance parameters are defined and discussed. Product descriptions are presented for the instruments that are commercially available for measuring these characteristics and parameters. In addition to listing the suppliers' names, addresses, and telephone numbers, the product descriptions contain a brief summary of the electrical and physical characteristics of the instruments, data storage and data reduction capabilities, and mid-1985 prices. Indexes are presented that are designed to provide the reader with quick access to the individual product description sheets. A glossary and a bibliography (which is oriented towards wind resource and wind turbine performance testing) are provided.

47465 **(EPRI-AP—4590) Testing requirements for variable-speed generating technology for wind turbine applications. Final report.** Herrera, J.I. (Electrotek Concepts, Inc., Knoxville, TN (USA)). May 1986. 56p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920321.

Guidelines for evaluating the impacts of integrating variable-speed, constant-frequency (VSCF) wind turbines into electric utility systems have been proposed based upon prior test experiences with the NASA VSCF system and the expected performance of the Westinghouse and OMNION VSCF systems. The NASA and Westinghouse VSCF generating systems use a wound rotor induction generator and a cycloconverter, while the OMNION system uses a wound rotor induction generator and a dc-current link converter. The design of VSCF/utility system interface requirements and test plans is based on utility system electrical issues such as utility

system control and operation, protection, voltage/reactive power management, power quality, and reliability. A framework for testing VSCF concepts is proposed which includes a three stage process: modeling of the system to analyze design alternatives and simulate disturbances that could be harmful to the actual system; laboratory testing which involves the use of the system under controlled conditions; and field testing to collect data under actual conditions to validate models and analyze the wind turbine behavior.

47466 **(EPRI-AP—4638) Solano MOD-2 wind turbine: operating experience, September 1984-August 1985. Final report.** Steeley, W.J.; Ilyin, M. (Pacific Gas and Electric Co., San Ramon, CA (USA). Dept. of Engineering Research). Jun 1986. 61p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920352.

Pacific Gas and Electric (PG and E) is operating and maintaining a 2500 kW MOD-2 wind turbine in Solano County, California. The wind turbine is an upwind machine with a 90 meter rotor diameter. To improve the understanding of wind turbine technology, the Electric Power Research Institute has sponsored a project to evaluate and document PG and E's experiences from September 1984 through August 1985. This report describes the performance of the PG and E wind turbine. The wind resource characteristics such as wind speed and direction were measured at the meteorological tower near the wind turbine. These data were used as representative of the turbine's wind resource after doing a wind speed and direction correlation between the wind turbine and the meteorological tower. The Solano MOD-2's performance was determined by comparing the actual output versus the manufacturer's predicted output for certain wind speeds. There have been several modifications made to the wind turbine. In 1984, the wind turbine had to be derated to 2200 kW due to overcurrent relay trips during gusty wind conditions. Another modification occurred in March 1985, when the wind turbine's pitch control system was revised and as a result, the machine was upgraded from 2200 kW to 2500 kW. To date, this modification has improved the reliability of the machine during gusty wind conditions and also increased the energy output. The wind turbine's maintenance items were recorded so that possible improvements could be incorporated to reduce future repair work.

47467 **(EPRI-AP—4639) Wind power stations: 1985 performance and reliability. Final report.** Lynette, R. (Lynette (R.) and Associates, Inc., Redmond, WA (USA)). Jun 1986. 108p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920351.

The use of wind power stations to generate electricity represents a new technology for the utility industry. Little is known about long-term energy production, equipment availability, and operation and maintenance costs. The objective of this report is to present the results of an assessment of field experience at a number of wind turbine sites. The data primarily covers 1985 field experience, but also includes previous years' experience when available. Operational information was collected and assessed from twelve commercial wind power stations and three experimental test sites. The data covers thirteen different wind turbine types. Results are presented for the current experience, and projections are developed for future large wind power stations.

47468 **(NMRDI—2-73-4631) Development and demonstration of a VAWTPOWER 250 wind turbine. Final report.** Vosburgh, P.N. (Vawtpower, Inc., Rio Rancho, NM (USA)). Jun 1986. 175p. NTIS, PC A08/MF A01 - NMRDI Information Center, Univ. of New Mexico, 457 Washington SE, Albuquerque, NM 87108. File Number DE86901565.

A larger, more powerful and more cost-competitive vertical axis wind turbine ROTOR was developed, fabricated, installed, instrumented and tested. Starting with VAWTPOWER's commercially available VAWTPOWER 185 Wind Turbine (rated 185 kW @ 37 mph), this project evolved a ROTOR which will enhance product performance (annual energy from conversion of winds averaging 18 to 20 mph) by over 38% while increasing installed cost less than 15%. Reliability is improved. Maintenance is made easier. Assembly and installation procedures are simpler and expected to be less costly. The increase in productivity almost exactly balances the effect on internal rate of return on investment of the loss of the 15% federal energy tax credit, which expired at the end of 1985. The new ROTOR is 36% larger than the commercial product but ROTOR blade stresses have been substantially reduced by improved ROTOR geometry and avoidance of operation at excitation resonant frequencies. Initial testing of the prototype has confirmed the lower stresses as well as the accuracy of power projections in winds up to 33 mph. Installed on the existing VAWTPOWER 185 POWERHOUSE, the new ROTOR is controlled to shut down at a windspeed of 33 mph to keep the higher performance ROTOR from overpowering the brakes, transmission and generator. Peak power, therefore, is limited to 250 kW and the ROTOR is designated the VAWTPOWER 250.

47469 **(PNL—5857) Model for simulating rotational data for wind turbine applications.** Powell, D.C.; Connell, J.R. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1986. Contract AC06-76RL01830. 114p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86010784.

This document describes a wind simulation model to be used in relation to wind turbine operations. The model is a computer code written in FORTRAN 77. The model simulates turbulence and mean wind effects as they are experienced at a rotating point on the blade of either a horizontal-axis wind turbine (HAWT) or a vertical-axis wind turbine (VAWT). The model is fast, requiring 15 to 120 seconds of VAX execution time to produce a simulation and related statistics. The model allows the user to set a number of wind parameters so that he may evaluate the uncertainty of model results as well as their typical values. When this capability is combined with short execution time, the user can quickly produce a number of simulations based on reasonable variation of input parameters and can use these simulations to obtain a range of wind turbine responses to the turbulence. This ability is important because some of the wind parameters that cannot be precisely evaluated should be prescribed over a range of values. This document is essentially a user's guide. Its features include theoretical derivations, samples of output, comparisons of measured and modeled results, a listing of the FORTRAN code, a glossary for the code, and the input and output of a sample run.

47470 **(PNL—5903) Review of wind simulation methods for horizontal-axis wind turbine analysis.** Powell, D.C.; Connell, J.R. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1986. Contract AC06-76RL01830. 45p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86012223.

This report reviews three reports on simulation of winds for use in wind turbine fatigue analysis. The three reports are presumed to represent the state of the art. The Purdue and Sandia methods simulate correlated wind data at two points rotating as on the rotor of a horizontal-axis wind turbine. The PNL method at present simulates only one point, which rotates either as on a horizontal-axis wind turbine blade or as on a vertical-axis wind turbine blade. The spectra of simulated data are presented from the Sandia and PNL models under comparable input conditions, and the energy calculated in the rotational spikes in the spectra by the two models is compared. Although agreement between the two methods is not impressive at this time, improvement of the Sandia and PNL methods is recommended as the best way to advance the state of the art. Physical deficiencies of the models are cited in the report and technical recommendations are made for improvement. The report also reviews two general methods for simulating single-point data, called the harmonic method and the white noise method. The harmonic method, which is the basis of all three specific methods reviewed, is recommended over the white noise method in simulating winds for wind turbine analysis.

47471 **(SERI/SP—273-2911) Wind energy technical reading list.** (Solar Energy Research Inst., Golden, CO (USA)). 1986. Contract AC02-83CH10093. 20p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86010704.

The Wind Energy Technical Reading List provides a short bibliography of recent technical publications by the US Department of Energy's National Laboratories and their subcontractors and other organizations doing wind energy research and development. The list was prepared by the Technical Information Branch and the Wind Energy Research Center at the Solar Energy Research Insti-

tute (SERI). It includes journal articles, papers presented in conference proceedings, and technical reports.

47472 **(SERI/STR—217-2732) HAWT performance with dynamic stall.** Hibbs, B.D. (AeroVironment, Inc., Monrovia, CA (USA)). Feb 1986. Contract AC02-83CH10093. 88p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86004428.

In this report we calculated the effects of flow nonuniformities (wing shear, tower wake, yaw, and large-scale turbulence) on the performance of a horizontal axis wind turbine, accounting for dynamic stall. We modified the PROP program to incorporate and compare these effects with the uniform flow case. The MIT model, which predicts dynamic lift coefficients substantially higher than the static maximum values and includes a crude model of the vortex roll-off phenomenon, represented dynamic stall. As associated model for drag was also used. The dynamic stall model was tested against experimental data for three typical reduced frequencies. Good instantaneous correlation was obtained. The effects of nonuniformities with and without the dynamic stall were calculated using the Westinghouse Mod O and Enertech 44/25 turbines. Modeling the dynamic stall has little effect on performance. Furthermore, the performance with nonuniform flow differed only slightly from the uniform flow case. Thus the now PROP model provides a powerful general capability to handle nonuniform flows.

47473 **(SERI/STR—217-2899) Feasibility of using wind power for an aerostat-borne radar system.** Sklar, H. (Solar Energy Research Inst., Golden, CO (USA)). May 1986. Contract AC02-83CH10093. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86004461.

The feasibility of using a wind power system on an aerostat (tethered baloon) was studied. The system would be used by the US Air Force North Warning Program to provide power for a radar carried on the aerostat. Upper atmosphere wind data for a potential site were collected and probability functions for wind speed and wind power density calculated. Information was collected on aerostats, tethers, telemetry transmitters, and auxiliary equipment. Important design considerations were identified and useful mathematical expressions, e.g., wind reliability, derived. A first-cut wind power system was designed and system performance and aerodynamic loads were calculated. The benefits and risks of a wind power system were enumerated. The study concluded that a wind system is feasible for this application.

47474 **Reactive power compensating system.** Williams, T.J.; El-Sharkawi, M.A.; Venkata, S.S.; Butler, N.G. (to Dept. of Energy). US Patent Application 6-688,675. 4 Jan 1985. 93p. Contract AC79-80BP22849. DE86013776 NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86013776.

The circuit was designed for the specific application of wind-driven induction generators. It has great potential for application in any situation where a varying reactive power load is present, such as with induction motors or generators, or for transmission network compensation.

20 ELECTRIC POWER ENGINEERING

47475 **(EPRI-EL—4522-Vol.1) Advanced power system security analysis concepts. Volume 1. A governor load flow modeling and simulation method. Final report.** Schlueter, R.A.; Rusche, P.; Lotfalian, M.; Shu, L.; Yazdankhah, A.; Tedeschi, S.; Rhodes, R.; Idzior, D.; Whiting, D.; Sekerke, J. (Michigan State Univ., East Lansing (USA). Div. of Engineering Research). Jul 1986. 84p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920422.

The research performed in project RP1999-1 addressed two tasks. The first task, presented in Volume 1, (a) developed a load flow method that simulates the generator governor response to a loss of generation contingency; (b) developed methods for obtaining accurate governor models for analyzing inertial and governor contingencies; and (c) compared the performance of inertial and governor load flow simulations with transient stability simulations and actual measurements. Comparisons of simulations and measurements used a 200 generator, 2300 bus model.

47476 **(EPRI-EL—4522-Vol.2) Advanced power system security analysis concepts. Volume 2. Security and stability assessment methodologies. Final report.** Schlueter, R.A.; Rusche, P.; Lotfalian, M.; Shu, L.; Yazdankhah, A.; Tedeschi, S.; Rhodes, R.; Idzior, D.; Whiting, D.; Sekerke, J. (Michigan State Univ., East Lansing (USA). Div. of Engineering Research). Jul 1986. 88p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920423.

Volume 2 presents the results of the second task of project RP 1999-1; the development of a stability/security assessment methodology. A methodology was developed and tested that identifies weak transmission boundaries that are vulnerable to loss of synchronism for loss of generation contingencies. A security/stability assessment method was also developed and tested that identifies and ranks critical contingencies, identifies and ranks weak boundaries, and assesses the relative level of security for a particular operating conditions. Applications of the methodology were also discussed.

47477 **(EPRI-EL—4729) Lightning flash characteristics.** Orville, R.E.; Henderson, R.W.; Pyle, R.B. (State Univ. of New York, Albany (USA). Dept. of Atmospheric Science). Aug 1986. 35p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920427.

A magnetic direction finding network for the detection of lightning cloud-to-ground strikes has been installed along the East Coast of the United States. Most of the lightning occurring from Maine to Florida and as far west as Ohio, Kentucky, and Alabame is detected. Time, location, flash polarity, stroke count, and magnetic field initial peak amplitude are recorded in real time. Flash locations, time, and polarity are displayed routinely for research and operational purposes. The data are being compiled into a data base to provide statistical information necassary for the prediction of the surge performance of electric power lines and the improvement of surge protection practices. Preliminary results are presented in this report.

2001 Power Plants And Power Generation

REFER ALSO TO CITATION(S) 47201, 47379, 47616, 47617, 47746, 47786, 47911, 47926, 47927

47478 **(BMFT-FB-T—86-025) Design, construction and testing of a non-polluting coal fired power station - model power station Voelklingen. Final report.** Stoll, K.E.; Bleif, F. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 242p. (In German). NTIS (US Sales Only), PC A11/MF A01. File Number DE86752559.

The project concerns the design, construction and testing of a coal fired power station with better environmental compatibility, thermal efficiency and profitability. The concept of the Power Station has the following novel components: Natural-draft cooling tower, which is also the stack of the plant. The entire flue gas volume is cleaned in a desulfurization plant and emitted without reheating with the cooling air of the cooling tower. Hot-air gas turbine, mainly coal-fuelled, i.e. realisation of a combined cycle based on coal, with better thermal efficiency and fluidized-bed combustion in connection with a coal-dust-fired steam generator. Use of low-priced coal with low calorific value. A demonstration plant - "230 MW-Model-Power-Station Voelklingen" - was designed, constructed and tested during the period from 15 October 1977 to 31 December 1984. With 39 refs., 4 tabs, 56 figs.

47479 **(BMFT-FB-T—86-036) Integrated coal-gasification combined-cycle power plant, project definition (Phase I). Final report.** Schiffers, U.; Stocksmeier, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 248p. (In German). NTIS (US Sales Only), PC A11/MF A01. File Number DE86752558.

Based on the concept variants developed by KWU in the pre-project phase for a combined gas and steam turbine power plant with integrated coal gasification, the objective of the work on the project definition phase started in November 1983 was to develop a plant concept for the environmentally acceptable and economic generation of power from coal. Previous analyses were reviewed and assessed and the international state of the art was documented.

The external planning conditions were defined and the overall plant preplanning was performed. The main components and systems were determined and a component development program was prepared. The operating performance as well as the costs and economy were analysed. The project was processed in cooperation with the partners Krupp-Koppers GmbH, Linde AG, Saarbergwerke AG and Prof. Dr. Pfost of the Ruhr-University, Bochum, the latter two acting as subcontractors. 74 refs., 20 tabs., 52 figs.

47480 **(EPRI-EM—4643) International load management conference: proceedings.** Limaye, D. (Synergic Resources Corp., Bala-Cynwyd, PA (USA)). Jun 1986. 814p. (CONF-851215—). Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920370.

From International load management conference and exposition; Chicago, IL, USA (9 Dec 1985).

High capital costs of new generating capacity, uncertain load growth, and poor load factors represent important challenges to the electricity industry. Load management provides some of the tools to meet these challenges. This conference focused on the performance and cost of load management technologies and on utility experiences in testing and implementing the equipment.

47481 **(EPRI-P—4542) Capital cost estimates and schedules for coal-fired power plants. Final report.** Van Slambrook, R.T. (Bechtel Group, Inc., San Francisco, CA (USA)). Aug 1986. 178p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920437.

Conceptual designs and order-of-magnitude capital cost estimates, including expenditure schedules, have been prepared for conventional 330 MW and 500 MW pulverized coal-fired power plants located in Kenosha, Wisconsin, near an urban center, and Hermiston, Oregon, in a remote location. The plants have been designed and estimated for burning low-sulfur subbituminous Wyoming coal. The capital cost estimates are at end-of-year 1984 price level with no escalation and are based on the contractor's current construction projects and vendor pricing. Conservative estimating parameters, based on EPRI reports PE-1865 and P-2410-SR, have been used to ensure their suitability as planning tools for utility companies. The estimated total capital requirements range from $1,220 /kW for twin-500 MW units at Kenosha to $1,830/kW for a single-330 MW unit at Hermiston. Summary engineering/procurement/construction site-specific schedules are presented and reflect current industry trends for design, fabrication, delivery and erection of major plant components and differences in bulk material quantities. Accelerated schedules were developed to incorporate changes in procudures and/or practices that will shorten construction time, and the cost impacts and feasibility were assessed. Estimated of manual labor requirements and labor curves were also prepared. Findings show that a replicated plant built on Rolling 4 x 10's (70 hour workweek) would offer the shortest project schedule and be a superior choice if captial cost were the primary consideration. An overall schedule shortening of about four months would be achieved and corresponding reduction of $45 million or three percent of total capital requirements. An assessment of the effects of ten cases of deferral and/or cancellation ranging from six months before site work starts to two years after site work starts when engineering or construction is already in progress was performed. 12 refs., 41 figs., 37 tabs.

47482 **(PB—86-202298/XAB) Rotary pump seals in 2000 MW power stations.** Flitney, R.K. (British Hydromechanics Research Association, Cranfield). 1983. 10p. (TN—1991). NTIS, PC A03/MF A01.

Visits were undertaken to two 2000-MW coal-fired power stations, Eggborough and Ratcliffe. The pumping applications were discussed with the engineering staff of the stations with particular emphasis on the sealing systems employed, their reliability and the improvements the stations would like to see in these areas. The report summarizes the application areas and indentifies those where an increase in seal reliability would provide an operational advantage to the C.E.G.B.

2002 Environmental Control Technology

REFER ALSO TO CITATION(S) 47192

47483 **(DOE/FC/10616—2130) Sulfur dioxide emission control by furnace injection of a dry sorbent. Phase III. Economic assessment. Final report.** Lanier, W.S. (Energy and Environmental Research Corp., Irvine, CA (USA)). 24 May 1986. Contract AC21-84FC10616. 121p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86015095.

An economic analysis evaluating furnace injection of dry calcium-based sorbent to reduce SO_2 emissions from lignite-fired utility boilers indicates economic advantage for purchase of lime with on-site pressure hydration. This sorbent processing option requires capital expenditure for on-site hydration equipment, but those costs are more than offset by the lower unit cost of lime (relative to purchased pressure-hydrate). On-site calcination is economically viable only for retrofits requiring greater than 500 tons per day of lime. The economic advantage for purchase of lime with on-site hydration exists for both easy and difficult retrofit situations and for retrofits designed to achieve either 50 or 70% SO_2 removal. The study also includes an economic sensitivity analysis evaluating several system parameters. Included are boiler size, boiler capacity factor, coal sulfur content, sorbent unit cost and calcium utilization efficiency. The final portion of the study provides a comparison of sorbent injection SO_2 removal costs with the cost of SO_2 control by wet flue gas desulfurization (FGD). For 1.2% sulfur, lignite-fired boilers retrofit of furnace sorbent injection to obtain SO_2 control equivalent to EPA's New Source Performance Standard will cost at least $600 per ton SO_2 less than FGD.

2003 Power Transmission And Distribution

47484 **(CONF-8609118—1) High voltage direct current research program.** Long, W.; Gnadt, P.A. (Oak Ridge National Lab., TN (USA); Wisconsin Univ., Madison (USA)). 1986. Contract AC05-84OR21400. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013253.

From C.I.G.R.E. meeting; Paris, France (4 Sep 1986).

In 1984, a long-range program plan was prepared by the Oak Ridge National Laboratory (ORNL) for the Department of Energy Electric Energy Systems program (DOE/EES) on research and development of high voltage direct current (HVDC) power systems and components. The overall goal of the program is to provide electric system planners with HVDC technical options that may be compared with the high-voltage alternating current (HVAC) choices when designing or modifying power systems. Specific research objectives are to develop a fundamental understanding of dc/ac system interactions and economics, determine bulk power transfer options, investigate dc power delivery within high-density load areas, and develop dc components and systems.

47485 **(DOE/BP—555) Bonneville Power Administration's technical career program for professional engineers (TCPPE) gas-insulated substations (GIS) seminar: proceedings.** (USDOE Bonneville Power Administration, Portland, OR). Jun 1986. 83p. (CONF-8505294—). NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86012884.

From 3. annual seminar of the technical career program for professional engineers; Portland, OR, USA (10 May 1985).

The seminar concentrated on gas-insulated substations. Eight papers are included. (DLC)

47486 **(DOE/ET/29201—T1) Surge arresters for 1200-kV gas-insulated substation. Final report.** Connell, T.R.; Kalb, J.W. (Ohio Brass Co., Wadsworth (USA). Frank B. Black Research Center). Oct 1983. Contract AC01-76ET29201. 144p. NTIS, PC A07/MF A01; GPO Dep. File Number DE86012297.

With the exception of dynamic overvoltage performance at 1.4 pu, the electrical requirements were met. The design offers a 20% improvement in protective levels and is 60% smaller than conventional designs for gas-insulated substations. It is uniquely to the coaxial geometry of gas-insulated substations. It requires no special

manufacturing or assembly techniques. The design is suitable for dc use. A current limiting gap design of essentially the same geometry would apparently meet the requirements but would be less durable, likely not less costly and is probably no longer commercially acceptable.

47487 **(EPRI-EL—4388) Development of an SF_6 high-voltage dc circuit breaker. Final report.** Yoon, K.H. (Westinghouse Electric Corp., Trafford, PA (USA). Power Equipment Div.). Jul 1986. 110p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920424.

In a field trial on the West Coast high-voltage dc intertie, a circuit breaker designed much like an ac puffer breaker commutated currents of up to 1200 A. With minor modifications, devices based on this design should be able to handle 2200 A at 500 kV, thus increasing utility flexibility in operating dc systems.

47488 **(ORNL/Sub—80-7979) Research on factors that affect the reliability of compressed gas insulated apparatus. Final report.** Cook, C.M.; Liu, Z.; Rynkowski, A.; Saito, K. (Massachusetts Inst. of Tech., Cambridge (USA). High Voltage Research Lab.). Jul 1986. Contract AC05-84OR21400. 222p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE86014417.

The reliability of compressed gas insulated apparatus (GIS) is determined by the electrical stresses in the system in relation to inherent strengths of the materials used. Models for gas insulation failure were developed and verified experimentally. Failure was the result of a two-stage process which involves initiation and then propagation sufficient to bridge the high voltage gap. Emphasis was placed on control of parameters and processes so that critical conditions for low voltage, low probability failures could be determined. A probability model for initiation considers the micro-irregularities on electrode surfaces and establishes breakdown probabilities calculating the likelihood of sufficient ionization to meet the streamer criteria. The probability analysis was used to model time to breakdown, electrode area effect, and pressure effect. Studies were made of breakdown initiated by electrode irregularities and metallic particles in the gas and along insulator surfaces. The initiation of flashovers was studied. The role of single particle and multiple controlled particles, showed the main sensitivity to be due to the maximum size field enhancement. The studies on insulator surfaces also included substantial modelling. Static charge transport was carefully investigated and reproducible and consistent results obtained. One conclusion is that electrode surfaces near insulators can greatly affect performance. Major advances in the understanding and prediction of low-probability failures were made as a result of this project. Recommendations concerning the improvement and monitoring of reliability of GIS were made.

47489 **(ORNL/TM—9596) Athens automation and control experiment: substation and distribution system automation designs and costs.** Purucker, S.L.; Thomas, R.J.; Fortson, N.H.; Monteen, L.D. (Oak Ridge National Lab., TN (USA)). Jun 1986. Contract AC05-84OR21400. 120p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014421.

The Athens Automation and Control Experiment (AACE) is a hardware- and software-oriented research and development project installed on the Athens Utilities Board's distribution system in Athens, Tenessee. Purposes are to automate the distribution system and to develop and implement control strategies that improve the efficiency and controllability of the power system. This report documents the automation designs and costs. The basic monitoring and control instrumentation system is discussed to show how the parameters of a 13-kV distribution system are measured. The telecommunication techniques used for transmittal of field data to the central control computer and for control signal transmission to the distribution equipment are explained. The installation designs for the hardware used on an automated distribution feeder are presented. Four basic types of automated distribution feeder designs are discussed: load-break switch, power recloser, voltage regulator, and capacitor. The equipment installed in customers' residences for monitoring and controlling load is also described. The appendices to this report include the substation and distribution feeder single-line diagrams showing the location of the automation equipment, a tabulation of the functional requirements of the various types of remote terminal unit installations, the standard design drawings for the pole-mounted equipment, equipment specification data sheets, and material costs and labor required for each type of installation.

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REFER ALSO TO CITATION(S) 47627, 48153

47490 **(INIS-mf—10197, pp 1-12) Impairment of properties of actinide mixes in the fuel cycles of LWR-type reactors and fast breeder reactors.** Koch, L. (Commission of the European Communities, Karlsruhe, Germany, F.R. European Inst. for Transuranium Elements). 1981. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

The different content in actinides is examined in the BWR and LWR fuel cycle. The dose rates of plutonium obtained from MAGNOX reactors, LWR-type reactors and plutonium recycled to LWR-type and BWR-type reactors are compared. The changes in actinide composition in those fuels is calculated after use in the reactor as a function of decay time before reprocessing and during storage and then compared to results obtained from experimental investigations. The marginal parameters discussed showed that fuel handling becomes more difficult with longer out-of-pile time.

2101 Power Reactors, Non-breeding, Light-water Moderated, Boiling Water Cooled

REFER ALSO TO CITATION(S) 47511, 47613, 47615, 47632, 47638, 47656, 47670, 47671, 47672, 47673, 47674, 47675, 47676, 47677, 47678, 47679, 47680, 47681, 47682, 47685, 47692, 47694, 47697, 47698, 47700, 47701, 47702, 47703, 47705, 47706, 47713, 47714, 47715, 47716, 47717, 47721, 47722, 47723, 47724, 47725, 47727, 47728, 47730, 47733, 47737, 47739, 47917

47491 **(HEDL—7591) Trend curve data development and testing.** McElroy, W.N.; Gold, R.; Simons, R.L.; Roberts, J.H. (Hanford Engineering Development Lab., Richland, WA (USA)). Aug 1986. Contract AC06-76FF02170. 82p. NTIS, PC A05/MF A01 - GPO. File Number TI86014374.

Existing trend curves do not account for previous and more recently observed test and power reactor flux-level, thermal neutron and gamma-ray field-induced effects. Any agreement between measured data and trend curve predictions that does not adequately represent the important neutron environmental and temperature effects as well as the microstructural damage processes, therefore, could be fortuitous. Two principal questions asked concerning the metallurgical condition of the pressure vessel and its support structures are: What are the controlling variables; and What effects do they have on changing the metallurgical properties of the vessel and its support structures throughout their lifetimes.

47492 **(NUREG—1202) Technical Specifications, Hope Creek Generating Station (Docket No. 50-354). Appendix "A" to License No. NPF-57.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jul 1986. 513p. NTIS, PC A22/MF A01 - GPO. File Number TI86901612.

Information is presented concerning: safety limits and limiting safety settings; limiting conditions for operation and surveillance requirements; design features; and administrative controls for the Hope Creek Generating Station.

47493 **(NUREG/CR—4367-Rev.1) ORVIRT.PC (Version 2.0): a 2-D finite-element fracture analysis program for a microcomputer. Revision 1.** Bryson, J.W. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 68p. (ORNL—6208/R1). NTIS, PC A04/MF A01 - GPO. File Number TI86014238.

ORVIRT.PC (Oak Ridge VIRTual crack extension. Personal Computer) is a two-dimensional (2-D) finite-element fracture analysis program for an IBM PC/AT or PC/XT microcomputer. The code is based primarily on the techniques used in the

ORMGEN-ADINA-ORVIRT fracture analysis system. ORVIRT.PC is a stand-alone program capable of performing 2-D linear-elastic stress and fracture-mechanics analyses. The present version (2.0) has been upgraded to include axisymmetric analysis capability. Thermal loadings may be analyzed in addition to mechanical loadings. Crack-face tractions may also be considered. Eight-noded isoparametric elements that combine both performance and ease of modeling are employed in the program. Special crack-tip elements that allow for an inverse square root variation in the near tip stress and strain fields may be used at the crack tip. Detailed user instructions describe both preparation of input data and program operation. Sample problems are presented that demonstrate good agreement with known solutions. 14 figs.

47494 **(NUREG/CR—4503-Vol.1) Long-term embrittlement of cast duplex stainless steels in LWR systems. Annual report, October 1984-September 1985.** Chopra, O.K.; Chung, H.M. (Argonne National Lab., IL (USA)). Jan 1986. Contract W-31-109-ENG-38. 38p. (ANL—86-3-Vol.1). NTIS, PC A03/MF A01 - GPO. File Number TI86007561.

This progress report summarizes work performed by Argonne National Laboratory on long-term embrittlement of cast duplex stainless steels in LWR systems during the 12 months from October 1984 to September 1985. 15 refs., 17 figs.

47495 **Reactor shutdown experience.** Kimmins, A.D.C. (comp.). 27: No. 1, 85-86(Jan-Mar 1986).

This section presents a regular report of summary statistics relating to recent reactor shutdown experience. The information includes both numbers of events and rates of occurrence. The information was compiled from data about operating events entered into the RECON data system by Nuclear Operations Analysis Center at the Oak Ridge National Laboratory, covering the three-month period of the third quarter of 1985. Cumulative information, since May 1, 1984, is also shown. Updates on shutdown events included in earlier reports are excluded.

47496 **Comparative steady-state and power-ramping performance of annular-coated-pressurized, sphere-pac and reference test rods in the Halden BWR.** Crouthamel, C.E.; Woods, K.N.; Barner, J.O. (Exxon Nuclear Co., Inc., Richland, WA, USA; Battelle Pacific Northwest Labs., Richland, WA, USA). 17: No. 3, 193-219(1986).

Instrumented fuel rods were irradiated and power-ramp tested in the Halden Boiling Water Reactor under the Fuel Performance Improvement Program. The fuel rods were irradiated to burnup levels up to 16 MWd kgM^{-1} at linear heat generation rates of up to approx. 40kWm^{-1}. After these base irradiations, the fuel rods were power ramped to terminal powers in the 66-74 kW m^{-1} range. The types of fuel rod instrumentation included cladding elongation monitors, internal rod pressure sensors, and fuel centerline thermocouples. None of the fuel rods failed during the base irradiation or power-ramping tests. This paper summarizes the measurements performed during these irradiation tests and discusses the specific irradiation behaviour of each fuel design concept.

2102 Power Reactors, Non-breeding, Light-water Moderated, Non-boiling Water Cooled

REFER ALSO TO CITATION(S) 47347, 47491, 47493, 47494, 47495, 47511, 47613, 47614, 47615, 47632, 47633, 47634, 47638, 47653, 47654, 47655, 47656, 47670, 47671, 47672, 47673, 47674, 47675, 47676, 47677, 47678, 47679, 47680, 47681, 47682, 47685, 47691, 47692, 47693, 47694, 47695, 47696, 47697, 47698, 47700, 47701, 47702, 47703, 47705, 47706, 47713, 47714, 47715, 47716, 47717, 47719, 47720, 47727, 47728, 47731, 47732, 47734, 47737, 47739, 47908, 47917, 47922, 47941, 48252, 48719, 48769

47497 **(EPRI-NP—4550) Condensate polishers for brackish water-cooled PWRs.** Sadler, M.A.; Darvill, M.R.; Bickerstaffe, J.A.; Chakravorti, R.; Siegwarth, D.P. (Central Electricity Generating Board, Bristol (UK). Scientific Services Dept.; Gibbs and Hill, Inc., San Jose, CA (USA); NWT Corp., San Jose, CA (USA)). Jul 1986. 204p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920433.

The objectives of project RP 1571-5 "Optimization of Pressurized Water Reactor Secondary Water Treatment: Task 4 Conceptual Design Options - Condensate Polishing" were to provide detailed guidelines for the design of a condensate polishing system for retrofitting to a seawater cooled PWR. For this purpose a national 1100MW PWR with recirculating steam generators was defined. The polished water to be produced by this plant must be of such a quality so as to permit the advisory SGOG guidelines on impurity levels in Steam Generator water to be achieved. Target maximum impurity levels in the final polished water were proposed by the RP 1571 Project review Team and adopted for this study.

47498 **(EPRI-NP—4551) Condenser improvements for PWRs.** Bacharier, J.; Chakravoti, R.K.; Siegwarth, D.P.; Kassen, W.R. (Gibbs and Hill, Inc., San Jose, CA (USA); NWT Corp., San Jose, CA (USA)). Aug 1986. 40p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920436.

Steam generators and turbines in pressurized water reactor plants have experienced a variety of corrosion problems as a result of ionic, corrosion product and oxidizing species transport into the steam generators. Turbine condenser modifications which will minimize cooling water and air inleakage, and improve reliability are specified for a 1160 MWe design basis plant. Cost estimates for instituting the modifications, and changes in operating and maintenance costs as a result of the modifications are given.

47499 **(EPRI-NP—4648) Effects of oxygen, copper and acid chlorides on denting corrosion.** Mann, G.M.W.; Castle, R. (Central Electricity Research Labs., Leatherhead (UK)). Jul 1986. 51p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920406.

The effect of dissolved oxygen and copper on denting corrosion at 280°C in solutions of NaCl at pH 9 with ammonia was investigated using a packed tube/support plate crevice in a laboratory simulation. The onset of corrosion was detected with a hydrogen analyzer sensitive to 0.2 ppB. In the absence of copper, rapidly rising hydrogen concentrations were detected only when the product of the chloride and oxygen concentrations were detected only when the product of the chloride and oxygen concentrations in the boiler-water exceeded 25 $(ppM)^2$, but at these high concentrations, unheated low-carbon steel surfaces in the system were as sensitive to corrosion as the heated crevice. When copper metal was present in the feed system, corrosion of the heated crevice occurred in the absence of oxygen, provided the copper had previously been exposed to dissolved oxygen. Dosing hydrazine into the feedwater eventually suppressed the ability of copper to initiate corrosion. It is proposed that copper ions are more efficient than oxygen in promoting corrosion within the crevice because unlike oxygen thay are carried into the crevice during boiling. Corrosion results from the anodic formation of acidic solutions in the crevice as a result of the cathodic reduction of oxidized copper species. 20 figs.

47500 **(EPRI-NP—4698) Industrywide survey of PWR organics. Final report.** Richards, J.E.; Byers, W.A. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Labs.). Jul 1986. 260p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920434.

Thirteen Pressurized Water reactor (PWR) secondary cycles were sampled for organic acids, total organic carbon, and inorganic anions. The distribution and removal of organics in a makeup water treatment system were investigted at an additional plant. TOC analyses were used for the analysis of makeup water systems; anion ion chromatography and ion exclusion chromatography were used for the analysis of secondary water systems. Additional information on plant operation and water chemistry was collected in a survey. The analytical and survey data were compared and correlations made.

47501 **(IKE—4-121) Solution of 2D and 3D hexagonal geometry benchmark problems by using the finite element diffusion code DIFGEN.** Gado, J. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme). Feb 1986. 29p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86752578.

The four group, 2D and 3D hexagonal geometry HTGR benchmark problems and a 2D hexagonal geometry PWR

(WWER) benchmark problem have been solved by using the finite element diffusion code DIFGEN. The hexagons (or hexagonal prisms) were subdivided into first order or second order triangles or quadrilaterals (or triangular or quadrilateral prisms). In the 2D HTGR case of the number of the inserted absorber rods was also varied (7, 6, 0 or 37 rods). The calculational results are in a good agreement with the results of other calculations. The larger systematic series of DIFGEN calculations have given a quantitative picture on the convergence properties of various finite element modellings of hexagonal grids in DIFGEN.

47502 **(IKE—6-151) Study concerning the calculation of burn-up of gadolinia-bearing PWR fuel elements.** Sannazzaro, L.R. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme). Dec 1985. 109p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752587.

The dissertation was intended to enhance information on the burn-up processes in gadolinia-loaded PWR fuel elements. The investigations were carried out on a test fuel element including gadolinium as a burnable poison, of the type used for the Biblis reactor. In such element, eight of the 236 fuel pins are loaded with 4 weight per cent of gadolinium. The study is based on a one-dimensional replacement cell whose material composition exactly corresponds to one eights of the fuel element. Burn-up calculations covered three cycles. Since the burn-up of the gadolinium isotope-loaded fuel strongly depends on local parameters, the study puts great emphasis on a good determination of heterogeneity effects, also when calculating resonance cross sections. The impact of zoning and re-calculation of multigroup cross sections at various burn-up points on the integral burn-up of the fuel element is investigated. Extensive isotope decay chains have been consulted so that the results obtained for residual absorption in gadolinia-loaded fuel can be said to be realistic.

47503 (INIS-mf—10145, pp 145-152) **Effect of technological design of tube-tubeplate joint of WWER steam generator on resistance to long-term stress in operating conditions.** Riha, Z.; Lichy, J. (Vitkovicke Zelezarny Klementa Gottwalda, Ostrava, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The technology of fitting tubes in collectors consists of two procedures: a front weld production between the end of the heat exchange tube and the opening of the tubeplate, and fixing the tube along the whole length of the opening in the tubeplate. In the WWER 440 steam generator, heat exchange tubes 16x1.4 mm in diameter from steel 08Cr18Ni10Ti are joined to tubeplates from the same steel in a thickness of 136 mm with openings 16.25 mm in dia. The technologies are discussed of hydraulic and explosion fixing. The latter takes 2 - 3 μs and the tube wall connects with the tubeplate at 150 $m.s^{-1}$. Following cyclic temperature stress the explosion-connected joints loosen and corrode. Surface explosion welding requires accurate configuration of joints with a gap size of ca. 0.7 mm and an explosive inducing the minimum tube impingement rate of 400 $m.s^{-1}$ at maximum cleanness of surfaces. These explosion welds are resistant to loosening. However, they must be tested for susceptibility to corrosion cracking. Hydraulic fixing is carried out by plastic deformation of the tube with a high pressure liquid. The joints are again susceptible to loosening. Further experiments to test the long-term properties of joints are being prepared by VUHZ Dobra.

47504 **NRC licensing of Diablo Canyon. Hearing before the Subcommittee on Energy Conservation and Power of the Committee on Energy and Commerce, House of Representatives, Ninety-Ninth Congress, First Session, July 10, 1985.** Washington, DC; Government Printing Office (1986). 326p.

The members of the Nuclear Regulatory Commission (NRC) and two California members of Congress testified at a hearing to examine the decision-making capacity and the integrity of the NRC. The specific issue was whether the issuance of an operating license to the Diablo Canyon nuclear plant violated the Atomic Energy Act in the area of safety. The transcripts of closed meetings of the NRC and the expression of concern by California congressmen and a member of the NRC about the Commission's decision-making process prompted the hearings. Specific concerns were the possible avoidance of a public hearing on emergency plans in the event of an earthquake and to avoid the costs of a hearing and the quality of information used as a basis for the decision. Each member of the Commission testified in response to these concerns. The California representatives noted that Commissioners did not follow legal advice, and that they relied upon second-hand information. Other material and documents submitted for the record follows the testimony.

2103 Power Reactors, Non-breeding, Graphite Moderated

REFER ALSO TO CITATION(S) 47501, 47522, 47739, 47742

47505 **(BNL—38379) Compact nuclear power systems based on particle bed reactors.** Horn, F.L.; Powell, J.R.; Steinberg, M.; Takahashi, H. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 10p. (CONF-860601—8). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014169.

From 4. international conference on emerging nuclear energy systems; Madrid, Spain (30 Jun 1986).

Compact, low cost nuclear power systems with an extremely low radioactive inventory are described. These systems use the Particle Bed Reactor (PBR), in which HTGR particle fuel is contained in packed beds that are changed daily. The small diameter particle fuel (500 μm) is directly cooled utilizing the large heat transfer area available (7.8 m^3/liter), thus allowing high bed power densities (MW/liter).

47506 (INIS-mf—10197, pp 37-44) **HTGR fuel elements for the U/Pu or Th/U fuel cycle and related problems of waste management.** Leushacke, D.F.; Kaiser, G.; Merz, E.; Nickel, H.; Huschka, H.H.; Pirk, H.; Ragoss, H.; Theymann, W.; Wilhelmi, G. (Kernforschungsanlage Juelich G.m.b.H., Germany, F.R.; Hochtemperatur-Reaktor-Brennelement G.m.b.H., HOBEG, Hanau, Germany, F.R.; Nuklear-Chemie und -Metallurgie G.m.b.H., NUKEM, Hanau, Germany, F.R.; Gesellschaft fuer Hochtemperaturreaktor-Technik m.b.H., Bergisch Gladbach, Germany, F.R.; Hochtemperatur-Reaktorbau G.m.b.H., Mannheim, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

In the determination of the U/Pu cycle for initial loading it was decided that in the long run the Th/U cycle is the developmental goal for HTGR-type reactors. A change to the Th/U fuel cycle is said to be feasible any time. Intermediate or ultimate storage of spent fuel elements is well practicable due to good fission product retention capabilities of the fuel element, strength of the fuel elements and little decay heat. The head end of reprocessing which is pretty much the same for $(Th,U)O_2$ fuel elements and UO_2 fuel elements was demonstrated to the decomposition of the heavy metal.

47507 **(JAERI-M—85-054) Inclining test for the bottom-core structure of VHTR.** Futakawa, Masatoshi; Kikuchi, Kenji. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Apr 1985. 22p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703192.

The change of acting forces on the core restrainers is studied by inclining a small-scale bottom-core structure model of VHTR. The forces produced by the inclination of the model simulate the horizontal seismic static forces. The behavior of the bottom-core structure was also analysed by using a simplified sliding-block model. The estimated apparent friction coefficients of both graphite against itself and graphite against steel are compared with the results obtained by means of a friction coefficient measuring appara-

tus and discussed. The conclusions derived are as follows: (1) The change of acting forces on the core restrainers die not reduce to zero after the inclining test. (2) The apparent friction coefficients were estimated to be 0.10 for graphite against itself and 0.19 for graphite against steel at the atmospheric environment.

47508 **(NUREG/CR—4526) Finite element analysis of the 2240 MW HTGR PCRV.** Fugelso, L.E. (Los Alamos National Lab., NM (USA)). Apr 1986. Contract W-7405-ENG-36. 40p. (LA—10663-MS). NTIS, PC A03/MF A01 - GPO. File Number TI86010876.

Three-dimensional finite element calculations for the response of the prestressed concrete reactor vessel for the 2240 MW HTGR which evaluated the stress distributions and concentrations were accomplished. Constitutive equations utilized in this evaluation were linear elastic, Von Mises elastic-plastic and the empirical Kotsovos-Newman concrete fit with and without steel reinforcing. Ultimate values of the internal pressures without initial prestress were obtained. Also stresses in the annular concrete retaining cover over the stream generator were evaluated.

47509 **Regulatory policy for advanced nuclear reactors. Hearing before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives, Ninety-Ninth Congress, First Session, October 31, 1985.** Washington, DC; Government Printing Office (1986). 101p.

Three members of the Nuclear Regulatory Commission (NRC), scientists, and representatives and analysts of the nuclear power industry testified on the NRC's plans for regulating the licensing of advanced reactors in order to protect the environment and ensure safety. Performance standards for manufacturers are the next step after investing dollars in advanced reactor research. NRC Chairman Nunzio Palladino outlined NRC's goals in developing a regulatory policy for new reactor designs that will stress standardization. Other witnesses described the reactive nature of past NRC regulation and the tendency to let cost considerations predominate, the importance of advanced reactor technology to supply electric power in the future, and the need to improve definitions in regulatory policy. Additional material submitted for the record follows the testimony of the seven witnesses.

2105 Power Reactors, Breeding

REFER ALSO TO CITATION(S) 47279, 47509, 47654, 47666, 47677, 47683, 47689, 47690, 47699, 47704, 47738, 47739, 47741, 47941, 49422

47510 **(CONF-860501—14) FPIN2 code: an application of the finite element method to the analysis of the transient response of oxide and metal fuel elements.** Hughes, T.H.; Kramer, J.M. (Argonne National Lab., IL (USA)). 1986. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014493.

From Conference on the science and technology of fast reactor safety; Channel Islands, UK (12 May 1986).

The FPIN2 code simulates the thermal-mechanical response of fast reactor fuel pins to transient events. Temperatures of the fuel pin and coolant are calculated using a simple pin-in-a-pipe geometry. The mechanical analysis uses an implicit finite element formulation with linear shape functions which allow for general material behavior in the fuel and cladding including cracking and melting. This formulation provides a very convenient structure for implementing different models and improvements in algorithms. The paper summarizes the FPIN2 methodology and presents results for the transient response of both oxide and metallic fuel pins under similar overpower transients.

47511 **(CONF-8510282—1) Components Technology Division: programs, projects, and supporting activities, FY 1985.** (Argonne National Lab., IL (USA). Components Technology Div.). Sep 1985. Contract W-31-109-ENG-38. 114p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86001406.

From University of Chicago Review Committee meeting; Argonne, IL, USA (8 Oct 1985).

As a result of the severe cutbacks in staff required by the decrease in our breeder reactor budget last year, the Components Technology Division has refocused effort in non-breeder areas. We have increased our non-breeder funding, and are continuing to seek new non-breeder work. Non-breeder programs now constitute the majority of our work (77%). This report presents information on the breeder and non-breeder reactor projects.

47512 **(INDC(CCP)—251/L) Measurement and evaluation of nuclear data for fissile and fertile isotopes: An important task of present-day physics.** Van'kov, A.A. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Jan 1986. 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703179.

This paper considers questions relating to the analysis of neutron cross-section measurements and measurements of transmission functions for heavy isotopes in the unresolved resonance region. It also considers questions connected with the evaluation of group constants. Conclusions are drawn regarding the need to set up new experiments for measuring transmission functions. Translated from Russian. 16 refs.

47513 (INIS-mf—10145, pp 55-61) **Evaluation of structural materials used for manufacture of BOR-1 steam generator.** Sima, A.; Houska, S.; Kostal, M. (Vyzkumny Ustav Energetickych Zarizeni, Brno, Czechoslovakia; Prvni Brnenska Strojirna, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The first Czechoslovak experimental modular steam generator, the 30 MW BOR-1, was manufactured in Czechoslovakia in 1973 and was put into trial operation at the BOR-60 nuclear power plant in Dimitrovgrad in the USSR. The steam generator was designed as a tri-metallic system. The casing tubes of the superheater were made of austenitic steel of the DIN 1.4306 type designated as 3R12. The heat exchange tubes in the superheater were made of high alloy material of the DIN 1.4876 type designated as SANICRO 31. The modules of the evaporator and the economizer were made of low-alloy ferritic-perlitic Nb-stabilized steel of the DIN 1.6770 type designated as HT8X6. In 1979, small and large leakages of the steam generator were simulated by injecting steam into sodium. After termination of the experiment the materials were subjected to metallographic investigation. In the 3R12 material long-term operation had not caused any substantial changes with the exception of precipitation of carbides at the grain boundaries under the surface. The SANICRO 31 material showed a negligible increase in strength and reduction in plastic properties. At the inlet of sodium into the superheater where the highest temperature is recorded the material showed a susceptibility to intergranular corrosion. The HT8X6 did not show any substantial changes in mechanical properties. On the inner surface of the tubes on the water side a layer of corrosion products and deposits was found up to 0.3 mm in thickness. In some places corrosion in form of pits and small cracks to a depth of 0.2 mm was found under the deposits.

47514 (INIS-mf—10145, pp 62-70) **Corrosion resistance in liquid sodium and residual life after 40,000-hour exploitation of structural materials used for BOR-1 steam generator.** Fresl, M.; Eremias, B.; Rosypal, J.; Rozumbersky, A. (Statni Vyzkumny Ustav Ochrany Materialu G.V. Akimova, Prague, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

A 40,000-hour corrosion test was carried out of structural materials on the 30 MW BOR-1 steam generator in Dimitrovgrad in the USSR. Tested in liquid sodium were the following structural materials: HT8X6 (Cr2.25Mo1Nb), 3R12 (Cr18Ni11) and S31 (Cr20Ni35Ti). The materials preserved their good mechanical properties, including unchanged structures of welded joints. Changes in carbon concentration were studied by gradual sampling of succes-

sive layers 25 μm in thickness. Carburization of all used materials was only found to have taken place in surface layers to a depth of 100-150 μm. Tests of intergranular corrosion only showed sensitization in S31 tubes, this most pronounced at the sodium inlet to the superheater, i.e., at 480 degC. A 10,000-hour corrosion experiment was made in liquid sodium at a temperature of 550 degC under conditions of convection flow. The test showed that uniform corrosion due to sodium does not affect the planned service life of used structural materials. Structural changes of the materials are described resulting from exposure to corrosion in the BOR-1 steam generator. Possible uses of HT8X6 and 3R12 for fast reactor steam generators are discussed.

47515 (INIS-mf—10145, pp 80-88) **Thermodynamics of material properties degradation in fast reactor steam generator under effect of liquid sodium.** Walder, V. (Vyzkumny Ustav Hutnictvi Zeleza, Dobra, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The possibility is discussed of a quantitative approach to the evaluation of changes in Nb-stabilized low alloy steel due to the effect of liquid sodium. The numerical finite difference method was applied to diffusion processes using the variability of all thermodynamic values entering the calculation. At thermodynamic balance with existing carbides, it will be possible to take into account the temperature gradient, the effect of the size of carbides and the effect of applied strain. The fact that the diffusion coefficient of carbide-forming niobium is by seven orders lower than that of carbon led to the use of the model of quasi-steady state diffusion. The dissolution of carbides and the diffusion of both elements is studied and the activities are investigated of carbon and niobium. The dissolution of NbC is controlled by the diffusion of niobium; the diffusion of niobium and carbon is induced by the balancing of their activities at the steel/sodium boundary. The local activity of carbon is at any moment determined via the steady state constant from the activity of niobium considering the type of carbide. The Nb-stabilized steel is characterized by a great difference in carbide sizes. Small carbides are accompanied by high carbon and niobium activities. Spontaneous diffusion occurs from the near vicinity of the carbides and the carbides dissolve. Stress increases activity thereby accelerating the process of decarburization of the steel in sodium.

47516 (INIS-mf—10145, pp 89-94) **Methods of estimating the service life of steam generator tubes considering the corrosion medium effect.** Machek, J.; Jaros, F. (Statni Vyzkumny Ustav pro Stavbu Stroju, Bechovice, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Vissalaje, Czechoslovakia (26 Sep 1984).

The corrosion effect is discussed of hot pressurized water on the service life of heat exchange tubes of the sodium evaporator of a fast reactor steam generator in the region of departure from nucleate boiling. The problems are discussed of corrosion fatigue of the tube material and of the propagation of small technological defects in the corrosion medium.

47517 (INIS-mf—10145, pp 95-104) **Analysis of conditions of corrosion fatigue of material of fast reactor steam generator evaporator and their simulation.** Kratochvil, J.; Walder, V.; Talpa, I. (Ceskoslovenska Akademie Ved, Prague. Fyzikalni Ustav; Vyzkumny Ustav Hutnictvi Zeleza, Dobra, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The service life is discussed of part of the evaporator of a sodium steam generator at the point of departure from nucleate boiling. An oxidized layer develops on the surface of the metal. This layer slows down the process of corrosion in the hot water medium, in the steam medium it accelerates it. In Cr2.25Mo1 steel in both steam and water a magnetite surface layer develops which in dependence on hydrogen diffusion decelerates the corrosion process. In case hydrogen diffusion is prevented a magnetite double layer develops consisting of an inner porous layer and a compact outer layer. Point metal corrosion then develops under the porous layer. In points of departure from nucleate boiling, cyclic heat fatigue moreover supports cracking of the oxide layer and concentration of impurities. The oxygen content and purity of water are also important factors. A facility is presented for the simulation of corrosion conditions, developed by VUHZ Dobra. Corrosion fatigue tests will be carried out on sample tubes strained with an electrohydraulic pulsator at a throughflow of corrosion medium. Maximum temperatures will be restricted to 343 degC, pressure to 17.2 MPa and the volume of transported water to 1590 l/h.

47518 (ORNL—6301) **Transfer of modified 9Cr-1Mo steel technology through cooperative programs (1980-1985).** Sikka, V.K.; DiStefano, J.R.; Patriarca, P. (Oak Ridge National Lab., TN (USA)). Jun 1986. Contract AC05-84OR21400. 67p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014397.

The principal objective of the United States Department of Energy (DOE) 9Cr-1Mo steel development program has been to provide the data and analyses required by designers for use of the alloy in advanced liquid metal reactors to reduce technical tasks and plant capital costs. It was recognized early that designers would not consider use of any material for nuclear applications unless there was a considerable body of experience already established. Toward this end, the plan has been to get the alloy accepted in Section I (Power Boilers), Section II (Materials Specifications), Section VIII (Pressure Vessels), and Section III (Nuclear power Plant Components) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code as logical steps in the process. To achieve this objective, extensive interaction with the industrial community was considered mandatory. Accordingly, an intensive effort to achieve technology transfer was initiated, which resulted in the involvement of many organizations. This report is a compilation of 47 status sheets describing 35 participating organizations and funding sources, purpose of the interactions, material and product forms utilized, summary of the work completed, findings, and appropriate references. These interactions contributed significantly toward the fulfillment of the program goals.

47519 (WAPD-TM—1555) **Testing of a production irradiated fuel assay gauge (LWBR development program).** Kahler, A.C.; Tessler, G. (Bettis Atomic Power Lab., West Mifflin, PA (USA)). Jul 1986. Contract AC11-76PN00014. 120p. NTIS, PC A06/MF A01; GPO Dep. File Number DE86014405.

A gauge has been designed and constructed to measure, nondestructively, the fissile content of spent fuel rods from the Light Water Breeder Reactor (LWBR) Core. This gauge, called the Production Irradiated Fuel Assay Gauge (PIFAG) uses the method of active neutron interrogation and delayed neutron detection. A set of calibration rods fabricated with the LWBR core and with known, as-fabricated, fuel content and diameters and lengths characteristic of those in the LWBR core are used to calibrate the PIFAG for assay operations. Mechanical and physics testing of the PIFAG was carried out inside a mockup of the actual hot cells in which the PIFAG is being operated. Following extensive testing of mechanical operations, four californium sources containing a total of about 8 mg of ^{252}Cf were used to verify the nuclear operation of the gauge. PIFAG calibration was obtained for seed, power flattening blanket, and reflector rods. The variation of gauge response with rod speed and ambient temperature, the ability of the gauge to detect small axial gaps in the fuel stack, and the sensitivity of the gauge to the presence of water within the rods were determined. On-line methods for testing the quality of data were also investigated. It is concluded that the PIFAG mechanical and nuclear performance is capable of meeting the limit-of-error requirements for assay of spent LWBR core fuel rods. 42 figs.

47520 **(BLL-RISLEY-TR—280-(9091.9F)) Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor.** Breitling, H.; Laue, H.; Julisch, P.; Stradtmueller, W.; Sturm, D.; Wiedemann, J. (UKAEA Risley Nuclear Power Development Establishment). Oct 1985. Translated Statische und Dynamische Zugpruefungen mit Grossplatten aus Werkstoff X 6 CrNi 18 11 zum Integritaetsnachweis des Reaktortanks fuer den Schnellen Natriumgekuehlten Reaktor SNR 300 Stuttgart, West Germany. (CONF-8510153—5-Trans.). 26p. British Library Lending Div., Boston Spa, England.

From 11. MPA seminar; Stuttgart, F.R. Germany (10 Oct 1985).

The reactor tank of the SNR 300 fast sodium cooled reactor was subjected to a safety assessment which took account of the results of wide plate tensile tests, in which the elongation at maximum load was applied as the instability criterion. The wide plates were, to the greater part, welded in the longitudinal and transverse directions and incorporated experimental flaws, approximately 60 mm long and of defined depth and orientation, in order to take account of any undetected cracks in the original component. The tensile tests were carried out at temperatures up to 550 deg C and included dynamic tests as well as conventional quasistatic, so as to simulate stressing conditions in the tank during a hypothetical power excursion. The reference strain rate during these tests was epsilon = 1/s. Under quasistatic loading, flaw free plates reached elongations of approximately 33% and approximately 7.5% under dynamic loading with artificial defects in the form of a central slit or fatigue crack. With comparable plates, no significant differences were observed between the results of quasistatic and dynamic tests. 1 reference.

47521 **(RISLEY-Trans—4113) Fast reactor status review: mechanical and thermohydraulic core engineering of large breeders.** Kleefeldt, K. Translated from 10: No. 3-4, 50-53(1978). 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE85902082.

The design of a reactor core is an optimization problem where account must be taken in a considered manner of the to some extent conflicting interests in respect of reliability, handling, safety and profitability. With the computer programs available today, this is only possible using iterative procedures. This means that for the individual specialist fields, like physics, thermohydraulics, mechanics and fuel pin technology, it is necessary in the first place to perform separate calculations with to some extent estimated starting variables, which then have to be refined until sufficient consistency is attained. As part of the initial planning for a 1300-MWe-plant, in collaboration with the institutes IMF, INR, IRB, IRE and the firms Belgonucleaire and Interatom a core of the type of the normal cylindrical two-zone core has been designed which will be used as a provisional working basis, among other things also for the forthcoming safety analyses. The following accounts of the methods and of a number of findings in the fields of mechanics and thermohydraulics are centered on this so-called homogeneous working core.

2106 Power Reactors, Auxiliary, Mobile, Package, And Transportable

REFER ALSO TO CITATION(S) 47631, 47658, 47659, 47660, 47661, 47662, 47663, 47664, 47827, 47828, 48300

47522 **(BNL—38312) Use of nuclear energy for bimodal applications in space.** Horn, F.L.; Powell, J.R.; Ludewig, H. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 6p. (CONF-860810—19). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014124.

From Intersociety energy conversion engineering conference; San Diego, CA, USA (25 Aug 1986).

The versatile bimodal nuclear reactor is proposed for producing space station-keeping power of 100's kW and also capable of bursts of power by ramping to 100's MW for short times to operate high power magnetic systems. The particle bed reactor, using half-millimeter diameter fuel particles immersed in coolant, provides the heat transfer capability needed for this power level. The coolant is a gas when directly coupled to a Brayton Cycle and is particularly responsive. The reactor design uses 37 fuel elements in a triangular pattern held in a cylindrical core. The reactor, radiator and turbogenerator are packaged for insertion into the shuttle cargo bay.

47523 (CONF-860102—Summs., pp PL-3.1) **Nuclear power: opening new vistas in space.** Vaughan, J.W. Jr. (Dept. of Energy, Washington, DC). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The nation faces a wide range of future civilian and military mission opportunities in space. However, many of the power requirements for these applications are beyond the capabilities of currently available energy sources. Nuclear energy can provide a prime source of this enabling power and the Department of Energy is fully committed to meeting the engineering and management challenges in developing nuclear power for space applications. The elements of the department's current Space Nuclear Power Program: Radioisotope Thermoelectric Generators (RTG's), Dynamic Isotope Power System (DIPS), Multi-Hundred Kilowatt Space Reactor Power System (SP-100), and Multimegawatt (MMW) Reactor Concepts are summarized. Several aspects of these efforts are discussed including Safety, Mission Focus, and Technology Development.

47524 (CONF-860102—Summs., pp MA-1.1-MA-1.4) **Space power needs and forecasted technologies for the nineties and beyond.** Benson, D.; Albert, T. (Science Applications International Corporation, Albuquerque, NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A new generation of reactors for electric power will be available for space missions in the nineties and beyond to satisfy military and civilian needs. The nuclear power plants being developed must be cognizant of other space power technology developments to ensure a useful product. Major advances are taking place in solar and chemical technologies. These need to be considered in establishing the goals of future nuclear power plants. Also, the mission needs are evolving into new regimes. Civilian and military power needs are forecasted to raise significantly over anything used in space to date.

47525 (CONF-860102—Summs., pp MA-2.1-MA-2.2) **Lunar nuclear power feasibility study.** Erdman, C.A.; Tran, T. (Texas A and M Univ., College Station). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The work reported here was performed as part of a contract for NASA's Johnson Space Center. NASA has identified a return to the lunar surface as one candidate mission for the year 2000. Suggested scenarios for lunar surface activities all involve substantial electrical power needs. The two main competitive electric power sources are solar and nuclear. Consideration was given to direct use on the lunar surface of one of the possible products of the SP-100 project. Five specific issues were identified in connection with direct use of an unmodified SP-100 system on the lunar surface. Each of these is discussed in the paper.

47526 (CONF-860102—Summs., pp MA-3.1) **Application of nuclear power to the mining of the Martian moons.** Leonard, R.S.; Blacic, J.D.; Vaniman, D.T. (Zia Co., Los Alamos, NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The reasons for considering the mining of the Martian Moons, the economic incentives for doing so, the probable composition of Phobos, and Deimos and a preliminary cost estimate for a conceptual system are presented in this paper. A brief review of the nuclear power plant design work done for the Satellite Power system for a deep space mining facility. Also discussed in the context of the markets that would be served by such an undertaking is how a Phobos Mining Corporation would fit into the overall inte-

gration of the space station, a lunar base and the exploration of deep space.

47527 (CONF-860102—Summs., pp MA-4.1) **Power requirements for space resource utilization.** Cutler, A.H. (Univ. of California San Diego, La Jolla, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Basic commodities will eventually be produced from the indigenous resources of space. Power demand for primary materials processing in space are of a different type and scale than those for other space missions. Power demands for various lunar oxygen producing factories are given in some detail. In addition, the production of lunar hydrogen and asteroidal or Martian propellants are discussed. This comprises the bulk of the paper and is intended to stimulate thought and discussion rather than present and optimal solution to meeting space resource utilization power requirements.

47528 (CONF-860102—Summs., pp RE-1.1-RE-1.3) **Radiation damage analysis for state of the art microelectronics.** Lazo, M.L.; Woodall, D.M.; McDaniel, P.J. (Univ. of New Mexico, Albuquerque). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

With the long lifetimes anticipated for space nuclear power systems, and the requirement to maintain a high degree of reliability and operability, significant advances will be demanded in the performance of electronic systems used on board spacecraft. Specifically, the electronic systems used on board platforms employing a nuclear reactor as the prime power source will be exposed to long term irradiation by neutrons and gamma rays from the reactor. These radiations are harmful to most electronic systems and must either be eliminated by shielding and separation, or their effects mitigated by radiation tolerant design procedures. Shielding of the reactor adds significant weight to the platform, and separation may make the platform difficult to control. There is a strong incentive to develop the most radiation tolerant electronic systems possible. This work investigated the assumptions of classical radiation damage analysis and found that correlation of integrated circuit radiation damage effects with displacement damage in silicon may not be an adequate approximation.

47529 (CONF-860102—Summs., pp RE-2.1-RE-2.2) **Radiation and high temperature effects in MOSFET.** Lin, T.J.; Wu, C.H.; Kumar, A.S. (Univ. of Missouri, Rolla). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A number of studies have been conducted in the past to model the behavior of MOSFET under both high temperature and irradiation conditions. The investigations were carried out to explore the possibility of salvaging irradiation-damaged n-channel and p-channel MOSFETs by proper annealing after irradiation. The MOSFETs were obtained from the Sandia National Laboratories. The first phase of the experiments consisted of obtaining device characteristics at elevated temperature (up to 200 C). In the second phase of experiments the devices were irradiated to a maximum dose of 10 Mrad (Si) using a Co-60 source. The devices were subsequently annealed at a temperature of 125 C for 48 hours to study annealing of the damage caused by irradiation. The results are reported.

47530 (CONF-860102—Summs., pp RE-3.1-RE-3.3) **Optimizing the radiation hardness of a Si-gate CMOS process.** Winokur, P.S. (Sandia National Lab., Albuquerque, NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726. Contract AC04-76DP00789.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Certain defense and nuclear-reactor system scenarios require VLSI ICs that are hardened to ionizing radiation levels above 10 Mrad. Although low-power metal-gate CMOS ICs can be hardened to 10 Mrad, the high packing densities and performance required by VLSI ICs are achievable only by using a Si-gate technology. To date, Si-gate ICs have been hardened to the 1-Mrad level by means of special processing. This paper presents a new way of optimizing the hardness of parts produced by a Si-gaet CMOS process. This new approach has resulted in the development of a VLSI process that consistently yields 10-Mrad hardened Si-gate ICs.

47531 (CONF-860102—Summs., pp RE-4.1-RE-4.3) **Gigarad-Tolerant power switches and memory elements.** Joyner, W.T.; Becknell, G.F.; Donelson, J.M.A. (Hampden-Sydney College, VA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A new class of silicon devices (Henderson 1978) operating without p-n junctions has been studied for radiation hardness. In contrast to the usual junction devices, these devices have a more or less uniform field throughout, thus causing high-voltage breakdown to increase with electrode spacing. The devices are prepared by making p+ and n+ contacts onto low-resistivity silicon, creating a p-i-n diode. Gold atoms are then diffused into the silicon to create deep impurity levels. A deep acceptor level and a deep donor level are created, both near the center of the band gap. The acceptor levels trap out the electrons, so that the initial low resistivity of the n-type doped wafer can be raised back to near-intrinsic values. The devices conduct primarily by negative carrier conduction for small currents. Electrons are injected at the n+ region and travel through the lattice. Holes injected at the p+ region are trapped near the anode. As the current is increased, the traps eventually fill, holes travel into the bulk material, and the device switches into a high conductance state. Creating sufficient deep traps by electron irradiation requires total electron fluences of $10^{16}/cm^2$ or more; thus these devices should tolerate radiation exposures in the Gigarad(Si) range, using conversion factors based on Vivilov (Vivilov 1981) and NASA (NASA 1982). Also, because of the electron trapping, conduction due to thermally-generated carriers should be inhibited. Temperature effects were therefore studied to 500 C.

47532 (CONF-860102—Summs., pp RE-5.1-RE-5.8) **TGA technique for determining the dose and dose-rate susceptibility of organic materials in nuclear power systems.** Dulka, C.P.; Komito, E.H. (General Electric Co., Wayne, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Since organic materials in nuclear power systems are radiation age-sensitive, it is critical to determine their degree of susceptibility. These materials applied for example in cables, packaging for electronics, shielding, insulation, etc. experience a radiation environment consisting of both a dose level and dose rate. The latter is significant when considering that some materials as discussed in several Sandia documents show a dose-rate dependence with regard to degradation. This paper addresses a practical means of establishing a radiation threshold and dose-rate dependences for organic materials. Thermogravimetric analysis (TGA) is the test vehicle and the results for Teflon TFE are presented to demonstrate the method. This technique which is being applied in a limited fashion in ground-based nuclear power systems should be successful in a space-based nuclear power system as well.

47533 (CONF-860102—Summs., pp RE-6.1-RE-6.4) **Review of the effects of radiation on optical fiber waveguides.** Partin, J.K. (Idaho National Engineering Lab., Idaho Falls). 1986. NTIS, PC A13/MF A01. File Number DE86005726. Contract AC07-76ID01570.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Optical communication and sensor systems used in various military applications such as the SP-100 Space Nuclear Reactor Power System Technology Program must be designed to withstand exposure to nuclear environments. The amount of exposure can vary from a very low dose delivered over a long period of time (e.g., outside of reactor containment or background radiation due to cosmic ray flux) to very high doses and dose rates (e.g., inside primary containment of a reactor, in the vicinity of a nuclear burst, or within the Van Allen belts). In the past decade much research has been performed to evaluate the effects of radiation on optical fiber waveguides. This research is reviewed.

47534 (CONF-860102—Summs., pp RE-7.1-RE-7.3) **Survivability of space nuclear power.** LaFrenz, R.L.; Lee, J.H. Jr. (S-Cubed Corp., La Jolla, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This paper serves as an introduction to this critical area of survivability analysis and design. The concepts of vulnerability, survivability, lethality and hardening are introduced and discussed as they relate to a nuclear power space platform. The hostile environments mentioned above are discussed but in a generic sense due to the unclassified nature of the presentation. Responses of representative space platforms are also discussed in terms of their impact on the system's survivability. Finally a methodology is presented that, if followed, will insure space nuclear power plants are designed and are maintained as survivable resources throughout their life cycle. The life cycle spectrum, important in cost trade studies is equally important in conducting a survivability assessment, since manufacturing processes, deployment, and low level long term environments can significantly detract from a system's survivability.

47535 (CONF-860102—Summs., pp TM-1.1-TM-1.2) **Experimental test of liquid droplet radiator performance.** Mattick, A.T.; Simon, M.A. (Univ. of Washington, Seattle). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This liquid droplet radiator (LDR) is evolving rapidly as a lightweight system for heat rejection in space power systems. By using recirculating free streams of submillimeter droplets to radiate waste energy directly to space, the LDR can potentially be an order of magnitude lighter than conventional radiator systems which radiate from solid surfaces. The LDR is also less vulnerable to micrometeoroid damage than are conventional radiators, and it has a low transport volume. Three major development issues of this new heat rejection system are the ability to direct the droplet streams with sufficient precision to avoid fluid loss, radiative performance of the array of droplet streams which comprise the radiating elements of the LDR, and the efficacy of the droplet stream collector, again with respect to fluid loss. This paper reports experimental results bearing on the first two issues - droplet aiming in a multikilowatt-sized system, and radiated power from a large droplet array. Parallel efforts on droplet collection and LDR system design are being pursued by several research groups.

47536 (CONF-860102—Summs., pp TM-2.1-TM-2.4) **Heat-pipe cooled radiator for a Brayton cycle space power system.** Lecocq, P.; Alleau, T. (Commissariat a l'Energie Atomique, Grenoble Cedex, France). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Preliminary studies have been carried out over the past three years by the CENTRE NATIONAL D'ETUDES SPATIALES (CNES) and the COMMISSARIAT A L'ENERGIE ATOMIQUE (CEA) with a view to the realization of a space nuclear power system of some 200 kWe. The reference system chosen includes a Brayton cycle converter, divided into four independent loops, associated with a heat pipe radiator that was selected for its reliability and redundancy capabilities. The availability of a theoretical model of the radiator is essential for its optimization, which is a trade-off between the thermodynamic performances of the converter and the area - hence the mass - of the radiating surface. This paper presents the initial results of the use of such a theoretical model.

47537 (CONF-860102—Summs., pp TM-4.1-TM-4.3) **Simulation of heat pipe rapid transient performance using a multi-nodal implicit finite difference scheme.** Peery, J.S.; BEst, F.R. (Texas A and M Univ., College Station). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Heat pipes are being considered as a part of the thermal management system of many space crafts due to the fact that heat pipes are capable of passively transporting large amounts of thermal energy over considerable distances with essentially no temperature drop. Mathematical modeling of heat pipe performance has been developed for both transient and steady state modes: however, existing transient heat pipe models are of limited accuracy during vary rapid transients. The modeling of the response of the vapor region in the event of rapid transients (including frozen start-ups) has not been investigated fully. The purpose of this study is to model the performance of a screened wick heat pipe in rapid transient modes and to determine the limiting conditions under which the heat pipe will operate.

47538 (CONF-860102—Summs., pp TM-6.1-TM-6.2) **Thawing of lithium in the SP-100 reactor core configuration.** Magee, P.M.; Malovrh, J.W.; REineking, W.H. (General Electric, Sunnyvale, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The General Electric SP-100 Liquid Metal Reactor is designed to be launched with the lithium coolant in the reactor and primary loops frozen. Initial startup of the system in space, after a satisfactory orbit is achieved, will be accomplished by slowly increasing the power in the reactor core and using the heat generated to melt the lithium, first in the reactor, and then progressively down the primary loops. This technique significantly facilitates ground handling, reduces vibrational loads during vehicle launch and minimized the shuttle bay heat load. The challenge is to thaw the coolant and startup the system within an acceptable time without structural damage. The test results clearly demonstrate that thawing of the lithium in the SP-100 reactor core can be done rapidly without structural damage and, thus, support the selected concept of SP-100 launch with frozen lithium and thaw/startup in space.

47539 (CONF-860102—Summs., pp TM-7.1-TM-7.3) **Liquid droplet heat exchanger studies.** Bruckner, A.P.; Shariatmadar, A.; Hedges, D. (Univ. of Washington, Seattle). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Recent studies at the University of Washington (Bruckner, et al., 1982, 1984, 1985) and elsewhere (Taussig, et al., 1985) have addressed the feasibility of direct contact heat exchanger concepts, such as the liquid droplet heat exchanger (LDHX), for space power systems. In the LDHX heat is transferred by direct contact between a recirculating cloud of finely dispersed liquid droplets and a working gas. A critical design requirements of the LDHX is effective separation of the heat exchange media following heat transfer. The principle of the cyclone dust separator, in which particulate matter is separated from a swirling gas by centrifugal forces, offers an effective approach to the problem. A variety of cyclone-based LDHX geometries have been investigated, culminating in a low aspect ratio vortex chamber configuration (Bruckner, et al., 1984, 1985).

47540 (CONF-860102—Summs., pp TM-8.1-TM-8.6) **Self-induced thermoelectric-electromagnetic pump model for SP-100 systems.** El-Genk, M.S.; Buksa, J.J.; Seo, J.T. (Univ. of New Mexico, Albuquerque). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

All three space nuclear powered system concepts pursued through the technology assessment phase of the SP-100 program employed liquid metal cooled reactors. (Anderson, et al., 1985, Baily et al. 1985, and Homeyer et al. 1985). The primary coolant of the thermoelectric concept and the secondary coolant of both the thermionic and stirling concepts are circulated by thermoelectric-electromagnetic (TE-EM) pumps. This paper presents a model for a TE-EM pump. The model, which considers the change in the magnetic flux density of the pump magnet with temperature, actually consists of three coupled sub-models: a magnet thermal analysis sub-model, and TE sub-model, and an EM pump sub-model. By using the TE-EM pump model, a parametric analysis was performed to study the effect on pump performance of a number of parameters, including: (a) the number of insulation foils wrapped around the pump magnet, (b) the ambient temperature in orbit, (c)

the partial loss of the pump radiator surface area, and (d) the failure of one or more of the pump radiator heat pipes.

47541 (CONF-860102—Summs., pp TM-9.1-TM-9.3) **Heat pipe entrainment analysis via optical methods.** DeHart, M.; Best, F. (Texas A and M Univ., College Station). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Entrainment in a wicked heat pipe is the stripping of liquid from the menisci of a capillary structure, preventing complete fluid circulation. Entrainment is perhaps the least studied of the energy transport limitations in the heat pipes, due to difficulties in measuring or observing it, and remains the greatest uncertainty in the flow modelling of heat pipes; thus, much work remains to be done in the study of this phenomenon. The objective of this study is to identify and characterize the physical mechanisms associated with the entrainment phenomenon.

47542 (CONF-860102—Summs., pp TM-10.1-TM-10.3) **Design and test program for a micro-gravity convective condensation experiment.** Kachnik, M.L.; Gaeta, M.; Terrell, J.; Best, F.; Faget, N. (Texas A and M Univ., College Station). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This paper describes the development of a convective condensation experiment package for use in a slow gravity environment on board the NASA KC-135 which has been specially modified for low gravity experiments. This experiment package provides flow rate, temperature, pressure drop and pressure measurements, gamma densitometer determination of void fraction and high speed photography of condensing flow in a low gravity environment monitored by a three axis accelerometer. Numerous low gravity condensation experiments took place in the 60's and 70's using mercury, water and freon-12 as working fluids. These experiments were principally concerned with pressure drop measurements and frequently did not monitor heat transfer rates. The present project is designed to monitor the flow regimes and heat transfer rates which exist in a micro-gravity environment.

47543 (CONF-860102—Summs., pp SI-1.1-SI-1.3) **Expert system for space power supplies.** Cooper, R.S.; Hoshor, A.; Thomson, M.K. (Creative Enterprises, San Diego, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Design and evaluation of space power supplies involves many qualitative, uncertain and heuristic factors that cannot be handled by conventional algorithmic computer programs. The authors are applying Artificial Intelligence/Expert Systems techniques to provide tools for designers and managers for the synthesis and analysis of space power supplies. The authors have evaluated the feasibility of an Expert System for the identification and selection of supplies for a wide range of NASA missions of various power levels (P) and durations (tau).

47544 (CONF-860102—Summs., pp SI-2.1-SI-2.2) **Performance aspects of integrating 100 kW/sub e/ class of space reactor systems.** Ewell, R.; Nesmith, B.; Fujita, T.; Stochl, R. (California Institute of Technology, Pasadena). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

In parallel with contractor studies of SP-100 nuclear power concepts encompassing conversion by thermoelectric, thermionic, and Stirling heat engines, a multi-laboratory systems analysis effort was undertaken to examine these same three alternative systems. Emphasis of the multi-laboratory work, involving the Jet Propulsion Laboratory, NASA Lewis Research Center, and Los Alamos National Laboratory, was placed on uniformity of analysis assumptions and procedures and consistency of data base inputs. This paper focuses on a central issues addressed in the multi-laboratory effort, namely, the trade-offs and system optimization aspects of integrating subsystems into the three alternative 100 kW/sub e/ class of space reactor power systems. This integration effort was governed by conditions imposed by a set of requirements (based on mission analyses) and constraints arising from considerations of technological risk. The primary objective was to select and match subsystem components in such a way that attractive design arrangements were delineated for all three alternative concepts. Other objectives were to determine the performance potential of the concepts as a function of potential advances in technology and the capabilities of the systems to grow in power level within the volume and mass limitations of the shuttle bay.

47545 (CONF-860102—Summs., pp RF-1.1-RF-1.4) **Uranium nitride fuel fabrication process development.** Chidester, K.M.; Matthews, R.B.; Mason, R.E. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Development of fabrication processes for UN fuel pellets and the characteristics of fuel used in the SP-100 irradiation tests are described. In addition, because earlier irradiation tests on UN suggest that high density and large grains reduced swelling and gas release studies performed to determine process parameters to fabricate this type of fuel and increase UN synthesis batch size is discussed.

47546 (CONF-860102—Summs., pp RF-2.1-RF-2.3) **Operating conditions of the SP-1 fuel test: a basis for post-test performance analysis.** Wilson, D.R.; Dutt, D.S.; Muraoka, J. (Westinghouse Hanford Co., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Two fast reactor irradiation tests, SP-1 and SP-2, provide a unique and self-consistent data set with which to evaluate the technical feasibility issues of potential fuel systems for the SP-100 space reactor. The first of these tests, SP-1, has completed its first irradiation period and is undergoing nondestructive and destructive examination. The results of these examinations will be reported in a separate paper in this session. An understanding of the fuel element and test capsule design and operating conditions is important to the interpretation and correct extrapolation of the observed performance. This paper discusses the procedures used to determine the SP-1 irradiation test operating conditions.

47547 (CONF-860102—Summs., pp RF-3.1-RF-3.6) **Postirradiation examination results from SP-1.** Karnesky, R.A.; Mason, R.E. (Westinghouse Hanford Co., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

In April of 1985 the SP-1 test successfully completed the first phase of its irradiation testing in EBR-II. This paper presents and interprets the results of nondestructive and destructive examinations conducted on the SP-1 fuel pins. Examination results from the SP-1 fuel pins have shown that both the UO_2 and UN fuels pins behaved well and reached approximately 20% of the goal burnup of SP-100, while operating at peak cladding temperatures at 1500 K. The UO_2 showed good compatibility, with the niobium-1% zirconium cladding and was not reduced by oxygen diffusion through the cladding to the lithium thermal bond. The interaction observed between the UN fuel and niobium-1% zirconium cladding confirms that a high quality tungsten liner will be needed with nitride fuel. UN swelling data have not been fully analyzed although it appears to be higher than expected. The future examination of the SP-1 test at goal burnup and examination of the SP-2 test will provide the data to address these issues.

47548 (CONF-860102—Summs., pp RF-5.1-RF-5.3) **Oxygen transport in a high temperature reactor.** Storms, E.K.; Ramsey, K.B. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The UO_2 fuel and lithium coolant in a high temperature reactor are incompatible and must be separated by a barrier which is

inert to both fuel and coolant. In addition, the barrier must retard the diffusion of oxygen so that the fuel is not depleted and the coolant is not made excessively corrosive. This study was undertaken to determine the diffusion flux of oxygen through several candidate barrier materials while observing their interaction with UO_2. Barrier candidate materials of Mo, Mo-13Re, Nb and Nb-1Zr were studied because no permeability values are available in the literature. Values are available for the diffusion constant for oxygen in some cases but to be useful this information must be combined with the uncertain solubility of oxygen in the material. Even if this information were available, several important assumptions must be made. The technique used here provides a more direct approach. Because of this very strong effect of oxygen composition, engineering studies done in the past, both in a reactor environment as well as under more conventional conditions, are compromised if this effect had not been taken into account. This work will attempt to demonstrate the importance of doing future studies using OU_2 which is well characterized.

47549 (CONF-860102—Summs., pp RF-7.1-RF-7.3) **Predicting nitride fuel performance for SP-100 conditions.** Baars, R.E. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The proposed thermoelectric fuel design was for 96% dense nitride fuel clad in 0.74 mm thick PWC-11 alloy (Nb-1%Zr-0.1%) with a 0.13 mm thick tungsten liner. The pin was to be operated at a peak cladding temperature of 1400 K, and was not vented. It would be operated at a peak power of about 13.4 kW/m to a peak burnup of 4.9 a/o. The pin diameter was 10.5 mm, with a 0.13 mm net radial gap between fuel and cladding. The pin was to be cooled by lithium. This paper reports on the methods used to evaluate the performance of the nitride fuel design proposed for the SP-100 thermoelectric concept.

47550 (CONF-860102—Summs., pp RF-8.1-RF-8.3) **SP-100 thermionic reactor: fueled emitter lifetime.** Begg, L.L.; Baars, R.E.; Veca, A.R. (Space Power Inc., Sunnyvale, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The SP-100 program lifetime requirement dictates that a power system be capable of 7 year operation. Without the benefit of a 10 year development program which includes real-time 7 year life tests, analytical tools were developed which determine the potential for thermionic fueled-emitters to meet 7 year lifetime targets. The means to extend lifetime well beyond the minimum requirement have been identified.

47551 (CONF-860102—Summs., pp RF-10.1-RF-10.2) **Cermet fuels for space power systems.** Barner, J.O.; Coomes, E.P.; Williford, R.E.; Neimark, L.A. (Pacific Northwest Lab., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726. Contract AC06-76RL01830;W-31-109-ENG-38.

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A refractory-metal matrix, UN-fueled cermet is a very promising fuel candidate for a wide range of multi-megawatt space reactor systems, e.g., steady-state, flexible duty-cycle, or bimodal, single- or two-phase liquid-metal cooled reactors, or thermionic reactors. Cermet fuel is especially promising for reactor designs that require operational strategies which incorporate rapid power changes because of its anticipated capability to withstand thermal shock.

47552 (CONF-860102—Summs., pp RF-11.1-RF-11.3) **Optimization of uranium nitride fuel designs for SP-100.** Peddicord, K.L.; Eubanks, D.L.; George, J.A. (Texas A and M Univ., College Station, TX). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The operating conditions in SP-100 may require unique criteria for optimizing the fuel designs. The high operating temperatures can lead to an increase in fission product swelling and gas release. The temperature conditions also require the use of refractory metals, some of which have low creep strength, for the clad design. Thus a condition of little or no fuel-clad mechanical interaction may be necessary for SP-100. If this condition is to be met throughout the pin lifetime, the pin must be designed such that fuel selling does not result in gap closure before the end-of-life. However, minimum gap widths and fuel-clad contact are desirable to facilitate heat transfer. To account for these mechanisms, optimization becomes important. An idealized methodology is considered to assess the potential input of various effects on fuel pin performance. For example, entrained porosity in the fuel influences both the swelling and thermal conductivity. The porosity can alleviate swelling by providing sinks for fission gas. However, additional porosity decreases thermal conductivity which, in turn, raises fuel temperatures and increases fuel swelling. For specific clad surface temperatures and porosities, the objective is to investigate the initial gap sizes which satisfy the constraint of gap closure at 4.5% FIMA. An evaluation is made of the effects on the thermal behavior of the fuel-clad gap dimensions and the entrained porosity and procedures are considered for determining optimum fuel designs.

47553 (CONF-860102—Summs., pp RF-12.1-RF-12.3) **Irradiation behavior of nitride fuel compared.** Mason, R.E.; Matthews, R.B. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Irradiation testing of nitride fuel types and development of UN fabrication processes are currently being addressed at Los Alamos. Only a limited irradiation data base exists at the peak burnups, temperatures, and lifetimes proposed for SP-100 class reactors. There is, however, a uranium-plutonium nitride data base at burnups to ~16 at.%. This paper will compare mixed nitride fabrication and irradiation data with available UN data and recent SP-1 results. Comparisons between as-fabricated fuel characteristics, irradiation conditions, fuel and cladding swelling, fission-gas release, microstructural changes, and fuel pin failure will be discussed.

47554 (CONF-860102—Summs., pp RF-13.1-RF-13.4) **SP-1 and SP-2 fuel pin fabrication.** Hoth, C.W.; Patterson, R.A. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The SP-1 and SP-2 fuel pin irradiation matrix included the use of Nb-1Zr, PWC-11 and Mo-11Re alloys for the fabrication of 25 fuel pins loaded with uranium nitride and uranium oxide. This paper provides a review of the fabrication processes (cleaning, annealing, welding) used with the refractory alloys and the fuel pin assembly. A summary of the fabrication methods used for the 25 SP-1 and SP-2 fuel pins is provided.

47555 (CONF-860102—Summs., pp NP-2.1) **Nuclear electric propulsion system and trajectory analysis for a Mars payload transfer system.** Lyon, W. III; Bhaskaran, S.; Black, W. III. (NASA Johnson Space Center, Houston, TX). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The paper summarizes the conceptual design of a mercury ion propulsion system for an unmanned, Mars Payload Transfer Vehicle and compares its performance to a chemical propulsion system. This vehicle is a component in the scenario developed by the Texas A and M University and the University of Texas at Austin's Manned Mars Mission Study conducted for the Universities Space Research Association.

47556 (CONF-860102—Summs., pp NP-4.1-NP-4.2) **Comparison of electric propulsion orbit transfer with SP-100 class reactors.** Britt, E.J.; Koester, J.K.; Wetch, J.R. (Rasor Associates Inc. and Space Power Inc., Sunnyvale, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Significant benefits in both spacecraft cost and payload delivered to higher orbits can be realized by using an orbital transfer vehicle combined with a nuclear electric thruster power source. The MPD thruster, with its operating voltage of a few hundred volts and specific impulse in the range of 1000-2000 seconds, is particularly well matched to this application. However, efficient MPD thruster operation requires a few megawatts versus the output of a few hundred kilowatts from a SP-100 class nuclear reactor. This mismatch can be circumvented by pulsed operation at duty cycles of less that 100%. A SP-100 reactor system can be matched to the MPD thruster by periodically charging a large inductor and releasing the energy into the MPD arc. Coupling effectiveness of 80-90% is feasible with this type of system.

47557 (CONF-860102—Summs., pp NP-5.1-NP-5.4) **PEGASUS: a multi-megawatt nuclear electric propulsion system.** Coomes, E.P.; King, D.Q. (Pacific Northwest Lab., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726. Contract AC06-76RL01830.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

With the Space Transportation System (STS), the advent of space station Columbus and the development of expertise at working in space that this will entail, the gateway is open to the final frontier. The exploration of this frontier is possible with state-of-the-art hydrogen/oxygen propulsion but would be greatly enhanced by the higher specific impulse of electric propulsion. This paper presents a concept that uses a multi-megawatt nuclear power plant to drive an electric propulsion system. The concept has been named PEGASUS, Power Generating System for Use in Space, and is intended as a work horse for general space transportation needs, both long- and short-haul missions. The recent efforts of the SP-100 program indicate that a power system capable of producing upwards of 1 megawatt of electric power should be available in the next decade. Additionally, efforts in other areas indicate that a power system with a constant power capability an order of magnitude greater could be available near the turn of the century. With the advances expected in megawatt-class space power systems, the high specific impulse propulsion systems must be reconsidered as potential propulsion systems. The PEGASUS power system is capable of meeting both the propulsion system and spacecraft power requirements. The propulsion system used by PEGASUS in the configuration considered here consists of a magnetoplasmadynamic thruster.

47558 (CONF-860102—Summs., pp NP-6.1-NP-6.4) **Particle bed reactor propulsion vehicle performance and characteristics as an orbital transfer rocket.** Horn, F.L.; Powell, J.R.; Lazareth, O.W.; Benenati, R. (Brookhaven National Lab., Upton, NY). 1986. NTIS, PC A13/MF A01. File Number DE86005726. Contract AC02-76CH00016.

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The use of a nuclear reactor to heat a rocket propulsion gas has the advantage of being able to choose the propulsion gas independently, without regard to its chemical reaction products. When hydrogen is used to cool a particle bed reactor the specific impulse approaches 1000 seconds which is more than twice that of chemical rockets. The high specific impulse allows payload weights double that of conventional rockets. The missions range from Low Earth Orbit (LEO) at 150 n-miles high to three times geosynchronous orbit (3 x GEO) at 58, 095 n-miles high and vary in complexity by dropping partial payloads in different orbits. The reactor design that produces the high gas temperatures up to 3500 K is of the particle bed fuel technology. The particles are 800 microns in diameter with a kernel of uranium carbide coated with alternating layers of pyrocarbon, silicon carbide, and zirconium carbide to contain the fission products. The superior heat transfer of the small particles is readily evident from their large surface area (50 cm^2 per cubic centimeter), and the high heat transfer coefficient from high velocity hydrogen.

47559 (CONF-860102—Summs., pp NP-7.1-NP-7.2) **Nuclear-microwave-electric propulsion.** Nordley, G.D.; Brown, W.C. (Edwards Air Force Base, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Electric propulsion can move more mass through space than chemical propulsion by virtue of the higher exhaust velocities achieved by electric propulsion devices. This performance is achieved at the expense of very heavy power sources or very long trip times, which in turn create technical and economic penalties of varying severity. These penalties include: higher operations costs, delayed availability of the payload, and increased exposure to Van Allen Belt radiation. It is proposed to reduce these penalties by physically separating the power source from the propulsion and use microwave energy beaming technology, recently explored and partially developed/tested for Solar Power Satellite concept studies, as an extension cord. This paper summarizes the state of the art of the technology needed for space based beam microwave power cost/performance trades involved with the use beamed microwave/electric propulsion for some typical orbit transfer missions and offers some suggestions for additional work.

47560 (CONF-860102—Summs., pp EC-3.1-EC-3.3) **Lifetime performance projections for in-core thermionic converters.** Vandersande, J.W.; Fitzpatrick, G.O. (California Institute of Technology, Pasadena). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The SP-100 thermionic reactor system design utilizes a reactor core consisting of 176 thermionic fuel elements, each of which consists of six thermionic converters. A projection of the performance of the system throughout its lifetime requires a detailed understanding of the performance characteristics of each individual converter, the performance of the complete array of electrically interconnected converters (and TFEs) and an identification and characterization of those physical phenomena which will result in performance and thus output power losses. The effort to make the performance and life projections and results are described.

47561 (CONF-860102—Summs., pp EC-5.1-EC-5.5) **Analysis of the transient behavior of thermoelectric generators.** El-Genk, M.S.; Seo, J.T. (Univ. of New Mexico, Albuquerque). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Among the energy conversion systems being considered for space nuclear power applications, the thermoelectric (TE) generators are the most developed system having extensive space flight experience in the Radioisotope Thermoelectric Generators (RTGs). Although in the RTGs, TE generators can operate at near steady load; in space nuclear power systems, however, they will be subjected to various operating transients, for example during the reactor start-up and shutdown and during a change in the electric load. Therefore, it is important to understand the transient behavior and the load following characteristics of the TE generators. The paper discusses the development and verification as well as as the application of a transient model for TE generators. The model is capable of handling any combination of boundary conditions at the hot and cold sides of the TE element and takes into consideration the change in the properties of the TE material with temperature. For a radiatively cooled SiGe/GaP TE element, the present results showed that following a step increase in the thermal power input, the TE conversion efficiency initially decreased then increased and subsequently approached a higher steady state value. On the contrary, following a step reduction of the thermal power input, the TE conversion efficiency initially increased then decreased and finally approached a lower steady state value.

47562 (CONF-860102—Summs., pp RS-1.1-RS-1.3) **Liquid metal reactor (LMR) design flexibility for space power needs.** Stephen, J.D.; Bailey, H.S. (General Electric Co., Sunnyvale, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The Liquid Metal Reactor (LMR) being developed by the General Electric Company for the Tri-agency SP100 program meets multiple needs, ranging from hundreds to thousands of kilowatts of thermal power to drive thermoelectric, Stirling, and other

power conversion systems, within stringent requirements for performance, and mass/size, long life, survivability and safety. Preliminary testing and evaluation of the design have resolved all the concept feasibility issues. The focus of the reactor subsystem is not on demonstration of the fuel, cladding and structure, criticality, components, heat transport, shields, control, survivability and safety in the ground engineering phase. This paper describes the key features of the reactor and shields subsystems, and the flexibility of these features to cover a wide range of system demands.

47563 (CONF-860102—Summs., pp RS-2.1-RS-2.4) **Status of CEA reactor studies for a 200 kWe turbo electric space power system.** Carre, F.; Gervaise, F.; Proust, E.; Schwartz, J.P.; Tilliette, Z.; Vrillon, B. (Commissariat a l'Energie Atomique, Gif-sur-Yvette Cedex, France). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The present European ARIANE space program will expand after 1995 in the development of the large ARIANE 5 launch vehicle. Considering, that the range of power needs (50 to 400 kWe) and operation times required for the space missions planned after the year 2000, are relevant to a nuclear power system, the French Centre National d'Etudes Spatiales (CNES) invited in 1983 the Commissariat a l'Energie Atomique (CEA) to undertake preliminary studies on space power systems. The purpose of the present two year phase (mid 1984-mid 1986) is to identify key technologies for a space generator within the power range of interest and to estimate the development cost of such a project to be examined for commitment in 1986. This work mainly consists in the feasibility and cost assessment of a reference 200 kWe turboelectric space generator, selected for the maturity and availability of the conversion system and for its attractive specific mass compared to thermionics and thermoelectricity, considering the available radiator area afforded by the specific ARIANE 5 geometrical features. The system is basically composed of a fast neutron spectrum lithium cooled reactor, of a Brayton conversion loop and of a heat pipe radiator.

47564 (CONF-860102—Summs., pp RS-3.1-RS-3.3) **Nuclear design of compact reactors for space application.** Porter, C.A.; Doncals, R.A.; Andre, S.V. (Westinghouse Advanced Energy Systems Division, Madison, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This paper describes the design philosophy and rationale employed by Westinghouse in the conceptual development of minimal mass power reactors for space applications. Studies have been performed which culminate in the design of several reactor cores which operate at a variety of power levels. Detailed neutronics calculations have been performed in support of liquid metal and gas cooled core concepts to predict core loading requirements, power distributions, temperature defect and burnup parameters.

47565 (CONF-860102—Summs., pp RS-4.1-RS-4.4) **Radiation transport phenomena in SP-100 shielding designs.** Wan, M.Y.; Perkins, R.G.; Carlson, D.E. (GA Technologies Inc., San Diego, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The design requirements for the SP-100 shield are to reduce the lifetime neutron fluence and integrated gamma-ray dose to allowable levels at a user interface plane located at a fixed distance from the reactor. Minimization of the shield mass, which generally accounts for 20% or more of system mass, is of utmost importance. Normally, a shadow shield is located between the reactor core and user interface plane. A material choice of lithium hydride combined with tungsten has for many years been the low mass solution for space reactor shielding. Such shadow shields have been designed for all the various reactor concepts considered for SP-100 and the shield materials and geometry optimization results are for the most part generic and not reactor concept dependent. Results are presented herein for transport analyses of SP-100 shielding where extensive diagnostic Monte Carlo calculations were conducted in order to delineate the transport phenomena which determine effective shield design approaches. Finally, a point design is presented which was developed for the thermionic concept but which is generally applicable to all SP-100 reactor concepts which employ a conical radiator between the reactor and user interface. The point design incorporates boronated zirconium hydride in order to further reduce shield mass.

47566 (CONF-860102—Summs., pp RS-5.1-RS-5.3) **Neutronics characteristics of space power reactors.** Little, W.; Barner, J. (Pacific Northwest Lab., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The objective of the paper is to describe the neutronic characteristics of a range of possible space reactor designs, and indicate the relative advantages and disadvantages of the various designs. Fuel designs to be considered are cermets (i.e., ceramic particles embedded in a metal matrix) consisting of UO_2 or Nn ceramic particles in matrices of Nb, Mo, Ta, or W. These cermet fuels are compared to a UN pin-type design. UN was selected for the reference fuel material since it has a somewhat higher density than UO_2 (i.e., 14.32 versus 10.96 gm/cc), which allows a lower minimum critical mass for both ceramic and cermet designs.

47567 (CONF-860102—Summs., pp RS-6.1-RS-6.3) **Space electronuclear generators the French approach.** Poher, I.C. (Centre National d'Etudes Spatiales, Paris Cedex, France). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

France has been looking at space electronuclear generators since 1982 from a paper feasibility study point of view via the cooperative effort of two major government agencies: CNES (Centre National d'Etudes Spatiales) for space and mission aspects, CES (Commisariat a l'Energie Atomique) devoted to research and development in nuclear aspects. The approach towards this kind of space generator has been oriented by mission and space transportation constraints quite different from those current in use for the SP100 specifications. The author compares these two different philosophies, get a clearer idea of how specifications have deeply influenced technical choices, giving, finally, very different reference systems.

47568 (CONF-860102—Summs., pp RS-7.1-RS-7.5) **SNPSAM - space nuclear power system analysis model.** El-Genk, M.S.; Seo, J.T. (Univ. of New Mexico, Albuquerque). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A simulation computer model SNPSAM (Space Nuclear Power System Analysis Model) has been developed for analyzing the Thermoelectric (TE) type SP-100 power systems (Baily, et al., 1985). This interactively coupled model is capable of predicting the operation and load following characteristic of the integrated power system during both steady state and transient operation. Additionally, the model can also be used for optimizing the design and for analyzing the survivability of a space nuclear power system. The model, for example can be used for studying the effects of the coolant type, the radiator design, and of a partial failure of the TE generators, and/or loss of the radiator surface area on the system's performance. This paper describes the present version (mode-O) of SNPSAM and presents the results obtained for the effects of the reactor thermal power, the ambient temperature in orbit, and the liquid metal coolant type on the specific pumping power and the electric power output of the system. The paper also discusses the results for the effects of the initial steady state power, and the power ramp mode (a step or a linear function) on the maximum electric power attainable by the system as well as the settling time. More details on the model description and the design parameters of the power system are available elsewhere.

47569 (CONF-860102—Summs., pp RS-8.1-RS-8.3) **ATHENA: a thermal hydraulic simulation code for space reactor system design and analysis.** Carlson, K.E., Ransom, V.H. (Idaho National Engineering Lab., Idaho Falls). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This paper describes the general capabilities available in the Advanced Thermal-Hydraulic Energy Network Analyzer (ATHENA) code and emphasizes those features particularly applicable to space reactor system analysis. This code has been developed as a part of the Department of Energy (DOE) Fusion Safety program for use in safety analysis of magnetic fusion systems. ATHENA is designed for transient thermal hydraulic analysis of systems which contain one or several fluid circuits with thermal interactions. The fluid systems can be either one or two phase and can contain a variety of component types such as pumps, valves, heat pipes, separators, and control systems. The ATHENA code has wide applicability for transient thermal hydraulic analysis and is currently being used for transient system simulation of candidate space reactor concepts.

47570 (CONF-860102—Summs., pp RS-9.1-RS-9.7) **Transient analysis of space reactors.** Giap, H.; Best, F. (Texas A and M Univ., College Station). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Nuclear reactors are being considered as the primary energy source for an increasing number of space missions. The reactor, power conversion, and heat rejection system must operate in zero gravity, are uniformly small and lightweight, and utilize exotic materials compared with terrestrial technology. Therefore the problems of system design and analysis are unique to space applications, and new analysis tools must be developed. With this motivation, the Transient Analysis of Space Reactors (TASR) computer code has been developed to predict system performance under steady-state and transient conditions. The SP-100 space reactor system, being designed by the General Electric Co., was used as the test system for the TASR code.

47571 (CONF-860102—Summs., pp RS-11.1-RS-11.3) **Simulation of the preliminary General Electric SP-100 space reactor concept using the ATHENA computer code.** Fletcher, C.D. (EG and G Idaho Inc., Idaho Falls). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The capabilities of the ATHENA computer code for simulating the transient thermal-hydraulic behavior of a space reactor have been demonstrated. This represents the first known application of a transient thermal-hydraulic space reactor system model incorporating heat pipes. The current ATHENA heat pipe model is preliminary, excluding its use for calculating very severe transient sequences. Anticipated near term improvements in ATHENA include adding potassium as a working fluid and upgrading the heat pipe model to simulate sonic and entrainment performance limits. Longer term, upgrading ATHENA for modeling the solid-liquid-vapor working fluid phases associated with space reactor startup and shutdown events is anticipated.

47572 (CONF-860102—Summs., pp TE-1.1-TE-1.3) **Recent BeO-reflector-controlled reactor experiments in.** McFarlane, H.F.; Brumbach, S.B.; Carpenter, S.G.; Collins, P.J.; McKnight, R.D. (Argonne National Lab., Idaho Falls, IN). 1986. NTIS, PC A13/MF A01. File Number DE86005726. Contract W-31-109-ENG-38.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Benchmark reactor physics experiments were conducted on a BeO-reflected, uranium-oxide-fuelled fast reactor assembly in ZPPR during January and February of 1985. These experiments, known as the ZPPR-14 Program, provide integral physics data on a reactor system with physics characteristics typical of those recently proposed for space power applications. Analysis of the data is proceeding with a variety of methods to test calculational models for reactor designs of this type.

47573 (CONF-860102—Summs., pp TE-2.1-TE-2.4) **Space-power advanced components engineering facility.** Gillies, B.B.; Zweig, H.R. (Rockwell International Corp., Canoga Park, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The progression of space-based power systems form technology studies to flight hardware requires a series of activities which establishes that the reliability of the product is high enough to warrant deployment, and that most or all of the technological risks have been removed. Among the steps involved in this process are (1) the demonstration by test of the key features of the proposed concept, and (2) testing of prototype systems and components to establish the reliability of the hardware and their integration into the final flight system. A test facility which meets these objectives must feature both high-temperature and high-vacuum capabilities. To satisfy this long-term programmatic need, ETEC is activating a testing system which incorporates a large vacuum chamber from the SNAP program and existing sodium heat transfer and heat rejection capabilities. This test facility will be available on a timely basis to support the SP-100 Ground Engineering System (GES) test and can support development testing for follow on programs.

47574 (CONF-860102—Summs., pp TE-3.1-TE-3.2) **Ammonia cleanup of SP-100 lithium components.** Crandall, D.L.; Reed, T.R.; Smolik, G.R. (Idaho National Engineering Lab., Idaho Falls). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Following testing of the SP-100 space reactor at the Ground Engineering System (GES) facility, the reactor components will be drained of their lithium coolant prior to reuse or post-test inspection. However, experience has shown that the lithium cannot be completely removed from the refractory metal surfaces and small passages of the reactor components by draining alone. It has been demonstrated that liquid anhydrous ammonia is an effective lithium cleaning agent in applications where it can be assured that the ammonia will remain in a liquid state (R.W. Harrison et al T-111 Rankine System Corrosion Test Loop, NASA Cr-134816). However, if ammonia is to be used to clean a SP-100 space reactor, some ammonia vapor is expected since the nature of the GES makes refrigeration of the reactor impractical. This paper reports experiments performed at the Idaho National Engineering Laboratory by EG and G Idaho, Inc. exploring the possibility of using liquid anhydrous ammonia to clean unrefrigerated space reactor components.

47575 (CONF-860102—Summs., pp TE-4.1-TE-4.3) **Lithium draining techniques and effectiveness.** Crandall, D.L.; Marts, D.J. (Idaho National Engineering Lab., Idaho Falls). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Testing of the SP-100 space reactor equipment at the Ground Engineering System (GES) facility will require removal of the liquid metal coolant prior to post-test inspection and re-use. This removal process would begin with draining followed by final complete removal of the liquid metal by a method such as liquid anhydrous ammonia cleaning. This draining process must maximize the removal of liquid metal in order to minimize the difficulty during final cleaning. The draining process must also provide predictable removal of the liquid metal so that the final cleaning system can be designed and sized. An experiment which examined gravity draining as a baseline and two pressure is described.

47576 (CONF-860102—Summs., pp TE-6.1) **Thermoelectric electromagnetic (TEM) pump test results.** Dahl, L.R.; Olich, E.E. (Nuclear Systems Technology Operation, Sunnyvale, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

As a key component of liquid metal cooled fast reactors for space application (SP-100), thermoelectric-electromagnetic (TEM)

pumps are being developed to circulate liquid metal through the reactor, primary loop piping and power converters. The TEM pump is a self energized, DC conduction, electromagnetic pump using thermoelectric materials to internally generate its driving electrical power from the heat flow between the hot pump ducts and a heat sink (radiator).

47577 (CONF-860102—Summs., pp TE-7.1-TE-7.3) **SP-100 ground engineering system test at Hanford.** Ethridge, J.L.; Dutt, D.S.; Mahaffey, M.K.; Hayden, K.D.; Miller, W.C.; Henrie, J.O. (Hanford Engineering Development Lab., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The SP-100 Ground Engineering System (GES) test will be a full-scale land based demonstration of the SP-100 space reactor. The test reactor will be representative of a 300 KWe (8000 kWt) power system. The reactor is a compact fast reactor cooled with lithium and operated at high coolant temperatures. The primary heat transport system will be constructed of refractory metals and enclosed in a high-quality vacuum chamber. The GES Site Operator will be responsible for providing facilities, equipment, reactor operations, and technical expertise to assemble, operate, and disassemble the test article. The Hanford Site facilities are used during four stages of the test: facilities for the pretest assembly of components; the primary facility for reactor operations and conduct of the nuclear tests; post-test examination facilities; and finally decommissioning and disposal.

47578 (CONF-860102—Summs., pp TE-8.1-TE-8.3) **SP-100 ground engineering system test facility for the Nevada Test Site.** Chi, J.W.H.; Bagnall, C.; Irby, H.H.; Wright, J.B. (Westinghouse Electrical Corp., Madison, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The Nevada Test Site is one of several potential test sites considered for the SP-100 GES Test Facility. This paper describes the test facility design proposed for the Nevada Test Site.

47579 (CONF-860102—Summs., pp RA-1.1) **Current state of the art in molybdenum and tungsten mill products.** Barto, R.L. 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The various applications for molybdenum and its alloys, as well as other refractory metals, have evolved because of the unique combination of physical and mechanical properties that this group of metals possess. A discussion of these properties, both from the positive and negative aspects, will highlight the current state of the art in the use of these materials. The commercial availability and manufacturing techniques available to produce the various mill product forms are discussed as they relate to current products, as well as the complexity of introducing new alloys and product forms. The interactions of research; product development; manufacturing development; quality assurance; and final availability on a commercial basis is a costly and time consuming process. Examples are given to demonstrate the evolution (not revolution) in introducing new materials into the marketplace. Current research and development activities presently being studies are presented along with applications covering a wide range of technologies.

47580 (CONF-860102—Summs., pp RA-2.1-RA-2.2) **Availability of niobium and tantalum-base alloy products for space nuclear reactors.** Kumar, P.K.; Huber, L.H. (Cabot Corp., Reading, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

In order to provide orbiting electrical power generators for use in Space, current US efforts are focusing on fast neutron flux nuclear power systems; these systems would generate in excess of 100 kW, yet be compact enough to be economically carried into Space by NASA's Space Shuttle. Considerable data on physical, mechanical and corrosion properties are available for the Nb and Ta-base alloys that are prime candidates for such structural components. However, most of these data pertain to the metallurgical state of the art of the 1965-1975 time period; therefore, they have to be reviewed and updated as appropriate to reflect present processing and manufacturing technology. This article summarizes this state of the art, making reasonable projections as well for ongoing improvements and their probable impact on alloy properties achievable in the 1990's.

47581 (CONF-860102—Summs., pp RA-3.1) **Selection of structural materials for space nuclear power generators.** Condliff, A.; Marsh, R.J. (Teledyne-Wah Chang, Albany, OR). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

In selecting materials for construction of space nuclear power generators, there are two major areas of equal importance to be considered: the mechanical, corrosion, and nuclear characteristics of the materials, either metals or non-metals, both short and long term; and the feasibility of producing these materials on a commercial or economical basis.

47582 (CONF-860102—Summs., pp RA-4.1-RA-4.3) **Refractory metal-matrix composites for space nuclear power applications.** Ammon, R.L.; Bleiberg, M.L.; Buckman, R.W. Jr. Westfall, L.; Petrasek, D.; McDanels, D. (Westinghouse Electric Corp., Pittsburgh, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Space nuclear power systems for SDI will require materials that have excellent high specific strength and creep resistance at high temperature, are compatible with space environmental conditions, and the heat transfer fluids of power conversion systems, and stable at high neutron fluence in extended operation. The development of composite components composed of continuous high strength tungsten alloy filaments in a ductile refractory metal alloy matrix is a logical next step in the progression of high temperature structural materials to meet these requirements. The basis for this technology advance is the extraordinary high temperature strength and recrystallization resistance of a class of tungsten alloys containing small quantities of hafnium carbide (HfC).

47583 (CONF-860102—Summs., pp RA-5.1) **Molybdenum-rhenium alloy development for space nuclear power applications.** Lundberg, L.B. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Refractory metals and refractory metal alloys are essential to the development of advanced nuclear reactor systems for space power applications because of the anticipated high operating temperatures of these systems. The refractory metals and alloys based on niobium, molybdenum, tantalum and tungsten are being considered for use in these systems because of their high temperature capabilities and compatibility with alkali metals. Molybdenum-base alloys offer many advantages in these systems, but their brittleness at low temperatures serves as a major deterrent to their use. Molybdenum-rhenium alloys with 11-13 wt% rhenium have been found to possess good low temperature ductility that results from the solution softening process in this alloy system. The development of solution softened molybdenum-rhenium alloys for use in space nuclear power applications is in progress at the Los Alamos National Laboratory, and this paper presents a review and update of this work.

47584 (CONF-860102—Summs., pp RA-6.1-RA-6.3) **Observations on the as-welded (GTAW) bend ductility of Mo-13 Re alloy.** Ammon, R.L.; Buckman, R.W. Jr. (Westinghouse Electric Corp., Pittsburgh, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

One of the refractory metal alloy compositions being considered for application in space nuclear power reactors is a binary

alloy of molybdenum containing approximately 10-15 weight percent rhenium. Rhenium additions of up to 50 wt% have been shown to improve the low temperature ductility of recrystallized molybdenum. Klopp and Witzke have also shown similar behavior in dilute molybdenum-rhenium alloy sheet and rod containing 11-14 wt% rhenium. Although rhenium additions are beneficial in lowering the ductile-to-brittle transition temperature in recrystallized material, little information is available on the behavior of welded material. The purpose of this study was to evaluate the effect of inert-gas-tungsten-arc-welding (GTAW) on the ductile-to-brittle transition behavior of molybdenum-13 wt% rhenium alloy sheet.

47585 (CONF-860102—Summs., pp RA-8.1-RA-8.2) **Thermal aging effects in refractory metal alloys.** Stephens, J.R.;. (NASA Lewis Research Center, Cleveland, OH). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Space power systems are currently being envisioned that will supply from 100 kw to multi-megawatts of electrical power for advanced space systems. To meet the system requirements, operating temperatures ranging from 1100 to 1500 K have been proposed. Expected life of these space power systems are from 7 to 10 years. Because of the high operating temperatures required to obtain the desired efficiencies, refractory metals are likely candidate materials for fuel cladding, liquid metal transfer, and heat pipe applications. In particular, the alloys of columbium, and tantalum are attractive from a strength and material compatibility viewpoint. Thermal aging studies on alloys of these materials are reviewed.

47586 (CONF-860102—Summs., pp RA-9.1-RA-9.2) **Irradiation swelling in self-ion irradiated niobium.** Bajaj, R.; Shiels, S.A.; Hall, B.O.; Fenske, G.R. (Westinghouse Advanced Energy Systems Division, Pittsburgh, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Refractory metals and their alloys offer distinct advantages for applications in nuclear systems where high temperatures are required because they exhibit high elevated temperature strength, better corrosion resistance in liquid alkali metal coolants and better thermophysical properties than other structural materials. One of the important aspects of applications of these materials at high temperatures in irradiation environments is the neutron induced swelling. However, swelling data for these materials are limited and the current theoretical treatments of swelling are not directly applicable to refractory metal since they were developed for face centered cubic (fcc) rather than body centered cubic (bcc) materials. This paper presents initial results of an investigation of swelling mechanisms in a model bcc metal; niobium. The objective of this work is to achieve an understanding of the elevated temperature swelling in bcc metals. A theory-experiment coupling is used to achieve this goal. The neutron induced swelling is simulated by irradiation with self-ions with an accumulated dose corresponding to $\sim 1 \times 10^{23}$ n/cm^2 (50 displacements per atom, dpa) which exceeds the fluences expected in SP-100.

47587 (CONF-860102—Summs., pp RA-10.1-RA-10.5) **High temperature in-reactor testing of Nb-1Zr, PWC-11, and T-111.** Atkin, S.D.; Puigh, R.J.; Hu, W.L. (Westinghouse Hanford Co., Richland, WA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A high temperature materials irradiation experiment is being conducted to determine the effects of irradiation on several refractory alloys under consideration for cladding and structural applications in the SP-100 Reactor. Unlike any previous reactor experiments, this test will be performed under prototypic conditions of a space reactor and will provide the first high temperature irradiation effects data on the candidate alloys. Results from the experiment will be used as a screening tool to identify those refractory alloys which possess the required toughness, ductility, and strength to merit further testing and consideration for the SP-100 Program.

47588 (CONF-860102—Summs., pp RA-12.1-RA-12.2) **Radiation effects on molybdenum and molybdenum alloys.** Moteff, J. (Univ. of Cincinnati, OH). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The influence of irradiation induced defects on the elevated temperature mechanical properties of molybdenum and molybdenum based alloys will be presented. The effects of these defects on the mechanical properties of metals and alloys will be described in terms of hardening and embrittlement. Generally, radiation hardening means an increase of the yield and ultimate tensile strengths, or an increase of rupture life, or a decrease of the creep rate. Embrittlement is measured by the amount of plastic strain before fracture, and these cluster defects invariably render a material less ductile.

47589 (CONF-860102—Summs., pp PC-2.1-PC-2.3) **Mass and loss analysis of a space-type radiation cooled insulated DC transmission line.** Schwarze, g.E. (NASA-Lewis Research Center, Cleveland, OH). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

As both the power levels and transmission distances increase such as for large future nuclear power systems, the transmission line becomes an important element in the power chain between the source and load bus. Thus, the transmission line's characteristics must be determined so that the effect of these characteristics on the total power system can be assessed. These design characteristics include the specific mass, percent power loss, size, voltage and power levels, and operating temperatures of the conductor and insulating materials. In a previous paper, the dc transmission line's characteristics of a noninsulated solid cylindrical conductor were determined. In that analysis the expression derived for the transmission line's mass only included the conductor mass and the operating temperature of the line was that of the conductor. In the analysis of this paper, a single layer of insulation is added to the solid cylindrical conductor. In this analysis the dependency of the dc transmission line's mass, loss, and size on the power and voltage levels, conductor and insulation surface temperatures, transmission distance, and conductor and insulation material properties is determined. This analysis can be extended to multi-layers of insulation but the complexity of the analysis increases as the number of layers increase.

47590 (CONF-860102—Summs., pp PC-3.1) **Composite aluminum conductors for pulsed power applications at hydrogen temperatures.** Ho, J.C.; Oberly, C.E.; Gegel, H.L.; O'Hara, W.T. (Wichita State Univ., KS). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

High-purity and stress-free aluminum has extremely low electrical resistance at liquid hydrogen temperature and strong magnetic fields. With this material in fine filaments to allow fast current penetration and embedded in a high-electrical-/low-thermal-resistance matrix to minimize loss problems, the composite conductory can be effectively used in pulsed power applications where liquid hydrogen is available, but liquid helium normally needed for superconducting devices is absent. Major manufacturing concerns require the matrix material to have workability compatible with that of aluminum and practically zero impurity diffusion to warrant the high purity of aluminum filaments in the final product. The authors report favorable results of a feasibility study on fabricating such a composite conductor. An aluminum-base alloy containing iron and cerium, recently developed as a high-temperature material with dispersion strengthening, was used as the matrix material. It satisfies most of the aforementioned requirements. Using a streamlined die, billets of this alloy with pure aluminum inserts were successfully extruded in steps. Processing parameters were selected based on results of processing simulation.

47591 (CONF-860102—Summs., pp PC-4.2-PC-4.4) **Cryogenic aluminum-wound generator rotor concept for space nuclear reactor systems.** Schlicher, R.L.; White, B.A.; Jacox, M.G.; Oberly, C.E. (Kirkland Air Force Base, NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The outline of a design for a liquid hydrogen cooled generator rotor that could be used to fabricate a 20 megawatt cryogenic generator is presented. (1. B.B. Gamble and T.A. Keim, High-Power Density Superconducting Generator, AIAA J. of energy, 1982, 6, pg. 38) could be utilized in this new cryogenic generator concept without electrical modification and with minimum modification to its housing. A hydrogen cooled aluminum rotor would eliminate requirements for helium liquifiers/refrigerators, expensive superconductors and extra vacuum and magnetic shielding in superconducting generator rotors.

47592 (CONF-860102—Summs., pp PC-5.1) **Inorganic dielectric insulation for superconducting Nb_3Sn wire.** Gupta, T.K.; Lawless, W.N.; Oberly, C.E.>. (Wright-Patterson Air Force Base, OH). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The need for high current, high field, low loss, stable superconductors has led to the development of multi-filamentary Nb_3Sn as the most promising conductor for the use in superconducting machines. Although a considerable advancement has been made in the development of multi-filamentary Nb_3Sn wire a suitable insulation system has not appeared to date. A major concern in developing an insulation system is the high formation temperature (700-800°C) of Nb_3Sn and the fact that it is brittle after its formation and cannot be deformed. This requires that the insulation must withstand this high formation temperature and yet will provide satisfactory electrical insulation at low use temperature (4-8 K). The organics are thus ruled out from consideration. A further requirement of the insulation is that it must absorb the thermal transients that are developed during fast charge and discharge; unless prevented, this may lead to an undesirable quench. A unique opportunity to achieve these goals is offered by the possible application of a new class of dielectric material as insulation coating for the Nb_3Sn wire.

47593 (CONF-860102—Summs., pp MM-1.1-MM-1.4) **Multi-mode nuclear space power systems.** Layton, J.P.; Grey, J. (Conceptual Design MS 115, Princeton, NJ). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

This paper is concerned with early versions of multi-mode nuclear space power systems (M-M NSPS) and their important mission applications for the early years of the next century. These systems are characterized as being capable of selectively operating over wide ranges of electric power levels and duty cycles and also produce direct propulsive thrust. Their special configurations will be composed of both current and neoteric elements and special configurations requiring substantial analysis, research, development and test.

47594 (CONF-860102—Summs., pp MM-2.1-MM-2.3) **Pellet bed reactor for multi-modal space power.** Buden, D.; Williams, K.A. (Science Applications International Corp., Albuquerque, NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A review of forthcoming space power needs for both civil and military missions indicates that power requirements will be in tens of megawatts. It is envisioned that the electrical power requirements will be two-fold; long-duration low power will be needed for station keeping, communications and/or surveillance, while short-duration high power will be required for pulsed power devices. These power characteristics led to authors to propose a multi-modal space power reactor using a pellet bed design. Characteristics desired for such a multi-megawatt reactor power source are the following: standby, alert and pulsed power modes; high thermal output heat source (around 1000 MWt peak power); long lifetime standby power (10-30 yrs); high temperature output (1500-1750 K); rapid burst power transition; high reliability (>95%); and meets stringent safety requirements. The proposed pellet bed reactor concept is designed to satisfy these characteristics.

47595 (CONF-860102—Summs., pp MM-3.1-MM-3.2) **Liquid metal cooled reactor - alkali metal thermoelectric space power system concept for multi megawatt applications.** Schmidt, J.E.; Chi, J.W.H.; Morgan, R.E.; Hanson, J.P.; Hunt, T.K. (Westinghouse Electric Corp., Madison, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A number of Strategic Defense Initiative missions require space power systems with lifetime on the order of 7 to 10 years and systems with reliabilities greater than 0.95. In addition, power source system mass must be as low as possible, consistent with existing and projected launch capabilities. For steady state power sources greater than tens of kilowatts, nuclear reactor systems would yield the lowest system mass. Among potential power conversion systems, Alkali Metal Thermoelectric (AMTEC) is highly attractive from a number of standpoints: it has the highest conversion efficiencies among the different types of static energy conversion systems at moderate operating temperatures that are reasonably high so that waste heat rejection can be carried out with relatively low system mass.

47596 (CONF-860102—Summs., pp MM-4.1-MM-4.2) **Comparison of multi-megawatt space nuclear power systems.** Chi, J.W.H.; Kesavan, K.; Morgan, R.E.; Schmidt, J.E. (Westinghouse Electric Corp., Madison, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The need for multi-megawatts of long-term steady state electric power has been identified for certain Strategic Defense Initiative mission. For power sources of this magnitude and duration, nuclear reactor power systems can provide the lowest total system mass. Potentially attractive nuclear reactor space power system concepts were evaluated and compared. The objective was to identify the most attractive power source system concepts.

47597 (CONF-860102—Summs., pp MM-5.1-MM-5.3) **Burnup versus criticality limitations for a potential space reactor design in the 1 to 100 MWth range.** Voss, S.S.; McDaniel, P.; Woodall, D. (Los Alamos National Lab., NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The reduction of lifetime for a specific reactor design by the loss of reactivity control using external control was studied at 1, 10, and 100 MWth. The enrichment was varied from 45% to 97% to observe the variation of lifetime as a function of fuel enrichment. Achieving the maximum lifetime may become the primary driver when tradeoffs between replacement costs, launch costs and system size are completed.

47598 (CONF-8506153—1) **Refractory alloy performance: unresolved issues and status summary.** Harms, W.O. (Oak Ridge National Lab., TN (USA)). 1985. Contract AC05-84OR21400. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE85014656.

From SP-100 systems selection committee review on fuels and materials conference; Los Alamos, NM, USA (20 Jun 1985).

Viewgraphs are included concerning the research work performed at ORNL on refractory alloys to be used in the SP-100 reactor design concepts. Mechanical properties and irradiation testing of the alloys are described.

47599 (PNL—5906) **Two-phase alkali-metal experiments in reduced gravity.** Antoniak, Z.I. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1986. Contract AC06-76RL01830. 69p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86012967.

Future space missions envision the use of large nuclear reactors utilizing either a single or a two-phase alkali-metal working fluid. The design and analysis of such reactors require state-of-the-art computer codes that can properly treat alkali-metal flow and heat transfer in a reduced-gravity environment. A literature search

of relevant experiments in reduced gravity is reported on here, and reveals a paucity of data for such correlations. The few ongoing experiments in reduced gravity are noted. General plans are put forth for the reduced-gravity experiments which will have to be performed, at NASA facilities, with benign fluids. A similar situation exists regarding two-phase alkali-metal flow and heat transfer, even in normal gravity. Existing data are conflicting and indequate for the task of modeling a space reactor using a two-phase alkali-metal coolant. The major features of past experiments are described here. Data from the reduced-gravity experiments with innocuous fluids are to be combined with normal gravity data from the two-phase alkali-metal experiments. Analyses undertaken here give every expectation that the correlations developed from this data base will provide a valid representation of alkali-metal heat transfer and pressure drop in reduced gravity.

47600 **(PNL-SA—13751) Rotating bubble membrane radiator for space applications.** Webb, B.J.; Antoniak, Z.I. (Pacific Northwest Lab., Richland, WA (USA)). Jan 1986. Contract AC06-76RL01830. 15p. (CONF-860102—12). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013601.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

An advanced radiator concept for heat rejection in space is described which uses a two-phase working fluid to radiate waste heat. The development of new advanced materials and the large surface area per mass makes the Bubble Membrane Radiator an attractive alternative to both conventional heat pipes and liquid droplet radiators for mid- to high-temperature applications. A system description, a discussion of design requirements, and a mass comparison with heat pipes and liquid droplet radiators is provided.

47601 **SP-100 program developments.** Schnyer, A.D.; Sholtis, J.A. Jr.; Wahlquist, E.J.; Verga, R.L.; Wiley, R.L. (NASA, Washington, DC; DOE, Washington, DC; DOD, Strategic Defense Initiative Organization, Washington, DC). pp 1.17-1.25 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

An update is provided on the status of the SP-100 Space Reactor Power Program. The historical background that led to the program is reviewed and the overall program objectives and development approach are discussed. The results of the mission studies identify applications for which space nuclear power is desirable and even essential. Results of a series of technology feasibility experiments are expected to significantly improve the earlier technology data base for engineering development. The conclusion is reached that a nuclear reactor space power system can be developed by the early 1990s to meet emerging mission performance requirements.

47602 **Application and use of nuclear power for future spacecraft.** Wetch, J.R.; Begg, L.L.; Dick, R.S. (Space Power, Inc., Sunnyvale, CA). pp 1.26-1.31 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

Recent plans for growth of civil and military applications of spacecraft and satellites has intensified interest in the use of nuclear power in space. Potential developers of nuclear power reactors and/or conversion systems have provided past papers describing various particular design aspects of their respective systems. This paper provides potential power system users with spacecraft integration concepts and limited data, that may help them identify where and how nuclear power may best be used to meet spacecraft systems power requirements. The paper discusses overall power system size, mass, thermal management, spacecraft configuration, and shielding of unmanned man-visited and continuously-manned systems. Discussion relative to safety imposed limitations and orbital maintenance limitations are included. 6 references.

47603 **Tethered nuclear power for the space station.** Bents, D.J. (NASA, Lewis Research Center, Cleveland, OH). pp 1.210-1.227 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

A nuclear space power system the SP-100 is being developed for future missions where large amounts of electrical power will be required. Although it is primarily intended for unmanned spacecraft, it can be adapted to a manned space platform by tethering it above the station through an electrical transmission line which isolates the reactor far away from the inhabited platform and conveys its power back to where it is needed. The transmission line, used in conjunction with an instrument rate shield, attenuates reactor radiation in the vicinity of the space station to less than one-one hundredth of the natural background which is already there. This combination of shielding and distance attenuation is less than one-tenth the mass of boom-mounted or onboard man-rated shields that are required when the reactor is mounted nearby. This paper describes how connection is made to the platform (configuration, operational requirements) and introduces a new element the coaxial transmission tube which enables efficient transmission of electrical power through long tethers in space. Design methodology for transmission tubes and tube arrays is discussed. An example conceptual design is presented that shows SP-100 at three power levels 100 kWe, 300 kWe, and 1000 kWe connected to space station via a 2 km HVDC transmission line/tether. Power system performance, mass, and radiation hazard are estimated with impacts on space station architecture and operation. 23 references.

47604 **Reactor/organic Rankine conversion - a sota solution to near term high power needs in space.** Niggemann, R.E.; Lacey, D. (Sundstrand Corp., Rockford, IL). pp 1.352-1.357 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

A nuclear Organic Rankine Cycle (ORC) system contains a sodium cooled reactor with a 783 K outlet temperature, an intermediate sodium loop interfacing with the vaporizers of two redundant power conversion units (PCUs) and a deployable heat pipe radiator. It is pointed out that the considered arrangement minimizes system weight while providing high reliability and eliminating single-point failures in the power conversion subsystem. Attention is given to a system description, reactor selection, the secondary loop, the PCUs system performance, system packaging, technology status, and growth potential. It is concluded that the nuclear-powered ORC is limited to several hundreds of kilowatts. However, it is implementable with existing technology. As reactor temperature capability improves and power requirements exceed several hundred kilowatts, it will probably be possible to utilize liquid metal Rankine cycles for a satisfaction of advanced system requirements. 16 references.

47605 **Space nuclear power plant technology development philosophy for a ground engineering phase.** Buden, D.; Trapp, T.J. (Science Applications International Corp., Albuquerque, NM; Los Alamos National Lab., NM). pp 1.358-1.366 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

The development of a space qualified nuclear power plant is proceeding from the technical assessment and advancement phase to the ground engineering phase. In this new phase, the selected concept will be matured by the completion of activities needed before protoflight units can be assembled and qualified for first flight applications. This paper addresses a possible philosophy to arrive at the activities to be performed during the ground engineering phase. The philosophy is derived from what we believe a po-

tential user of nuclear power would like to see completed before commitment to a flight development phase. 5 references.

47606 **Overview of the 1985 NASA Lewis Research Center SP-100 free-piston Stirling engine activities.** Slaby, J.G. (NASA, Lewis Research Center, Cleveland, OH). pp 3.180-3.188 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

This effort is keyed on the design, fabrication, assembly, and testing of a 25 kWe Stirling space-power technology-feasibility demonstrator engine. Another facet of the SP-100 project covers the status of a 9000-hr endurance test conducted on a 2 kWe free-piston Stirling/linear alternator system employing hydrostatic gas bearings. Dynamic balancing of the RE-1000 engine (a 1 kWe free-piston Stirling engine) using a passive dynamic absorber will be discussed along with the results of a parametric study showing the relationships of Stirling power converter specific weight and efficiency as functions of Stirling engine heater to cooler temperature ratio. Planned tests will be described covering a hydrodynamic gas bearing concept for potential SP-100 application. 15 references.

47607 **Static and dynamic high power, space nuclear electric generating systems.** Wetch, J.R.; Begg, L.L.; Koester, J.K. (Space Power, Inc., Sunnyvale, CA). pp 3.513-3.520 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

Space nuclear electric generating systems concepts have been assessed for their potential in satisfying future spacecraft high power (several megawatt) requirements. Conceptual designs have been prepared for reactor power systems using the most promising static (thermionic) and the most promising dynamic conversion processes. Component and system layouts, along with system mass and envelope requirements have been made. Key development problems have been identified and the impact of the conversion process selection upon thermal management and upon system and vehicle configuration is addressed. 10 references.

47608 **TEC and ultralloys for high-power space systems.** Morris, J.F.; Jacobson, D.L. (Arizona State Univ., Tempe). pp 3.521-3.527 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

Increasing space nuclear reactor (SNR) power requirements force system weights and temperatures upward. For such growth, thermionic energy conversion (TEC) excels in SNR service between tenths of a megawatt and about ten megawatts. TEC yields much current at low voltage, and, as total outputs soar, radiators at 400 K for conventional power conditioning (PC) balloon, compared with those at 1000 K and higher for TEC itself. To reduce PC problems, TEC requires contiguous high-temperature inversion or internal electromagnetic wave generation. Both are possible, potentially practical, and probably exploitable through research. However, attaining suitable efficiencies with these different operating modes and higher rejection temperatures demands new electrode and additive technologies, as well as decreased cesium pressures and increased TEC temperatures. Furthermore, such thermal growth necessitates alloys that approach ultimate metal capabilities for space applications. 19 references.

2107 Regulation And Licensing

REFER ALSO TO CITATION(S) 47504, 47509, 47723

47609 **(NUREG—0540-Vol.8-No.6) Title List of Documents Made Publicly Available, June 1-30, 1986. Volume 8, No. 6.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control). Aug 1986. 500p. NTIS, PC A21/MF A01 - GPO. File Number TI86901670.

Information received and generated by the US Nuclear Regulatory Commission (NRC) is described, including docketed material associated with civilian nuclear power plants and other uses of radioactive materials and nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The information is indexed by personal author, corporate source, and report number. (LEW)

2108 Economics

REFER ALSO TO CITATION(S) 47712

47610 **(INIS-mf—10187) Annual meeting on nuclear technology 1980. Technical meeting: Man-machine systems. Pt. 1.** (Deutsches Atomforum e.V., Bonn (Germany, F.R.)). 1980. 63p. (In German). (CONF-800386—Pt.1). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752574.

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

The papers deal with the necessity for automation of operating manuals, ergonomic design of nuclear power plant control rooms, experience gained in the training of personnel using simulators, requirements made on the personnel working shifts from the point of view of the Ministry of the Interior (BMI) and the qualification of the shift personnel.

47611 (INIS-mf—10187, pp 1-10) **Operating manuals as a medium between man and machine.** Beuerle, H.J.; Stoll, A. (Gemeinschaftskernkraftwerk Neckar G.m.b.H., Neckarwestheim, Germany, F.R.; Kraftwerk Union A.G., Erlangen, Germany, F.R.). 1980. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752574. (CONF-800386—Pt.1).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

The prime problem is the enormous extant of operating manuals. However, quick access is required. Only by way of automation the access was enabled and the role of intermediary of the operating manual between man and machine is ensured.

47612 (INIS-mf—10187, pp 11-17) **Ergonomic design of nuclear power plant central rooms.** Bohr, E. (Technischer Ueberwachungs-Verein Rheinland e.V., Koeln, Germany, F.R. Inst. fuer Unfallforschung). 1980. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752574. (CONF-800386—Pt.1).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

Consideration of human factors in the design of nuclear power plant control rooms is more and more becoming standard. To make such efforts efficient and successful, a sound basis must be found. This can be achieved by system-ergonomic design, i.e. by the systematic integration of problems related to human factors into the planning and development of control rooms. For this purpose, the use of system-ergonomic methods as early as in the initial stages of development, comprehensive consideration of ergonomic data and methods and securing of their application is required.

47613 (INIS-mf—10187, pp 18-28) **Experience gained in the training of nuclear power plant operating personnel with nuclear power plant simulators.** Buettner, J.; Fueg, J.; Schlegel, G. (Kraftwerksschule e.V., Essen, Germany, F.R.). 1980. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752574. (CONF-800386—Pt.1).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

The simulator of a PWR-type reactor with 1.200 MW was accomplished in September 1977. In January 1978, the simulator of a BWR-type reactor with 800 MW started operation. The American company Singer/Link supplied computer hardware and software; Kraftwerk Union AG supplied control room equipment, power plant data and acted as consulting engineers for the construction and acceptance of the simulators. This way it is ensured that the simulated process reflects the state of German nuclear engineering.

47614 (INIS-mf—10187, pp 41-61) **Qualification of shift personnel.** Distler, K. (Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Biblis, Germany, F.R. Betriebsverwaltung). 1980. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752574. (CONF-800386—Pt.1).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

For the positions of shift boss, shift boss' secondary and reactor operator, operating and monitoring tasks and the qualification required are derived by the example of German 1.300 MW PWR-type reactor design. The TMI/2 incident makes this an issue of utmost topicality. The state of discussions in the Federal Republic of Germany is shown.

47615 (INIS-mf—10197, pp 73-97) **Present and future use of plutonium in LWR-type reactors.** Schlosser, G.; Schlemmer, F.; Wunderlich, F.; Unger, H. (Kraftwerk Union A.G., Erlangen, Germany, F.R.; Kernkraftwerk Obrigheim G.m.b.H., Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

Reprocessing of irradiated fuel elements makes recycled fertile materials and fission products available for further use and transfers waste products for optimum waste management. Reusability of separated plutonium in LWR-type reactors has been proven by demonstration recycling. By sufficient solubility waste management by reprocessing will also be possible for MOX fuels without additional process sequences. Plutonium from reprocessed MOX fuel rods is also being used at KWO's as Ko precipitated fuel. The use of reprocessed uranium in earlier MOX fuel fabrication indicated that following re-enrichment it can not only be used in an LWR-type reactor until the resource potential is exhausted.

47616 (ORNL/Sub—85-7685/1-11) **Power plant economy of scale and cost trends: further analyses and review of empirical studies.** Fisher, C.F. Jr.; Paik, S.; Schriver, W.R. (Tennessee Univ., Knoxville (USA). Construction Resources Analysis). Jul 1986. Contract AC05-84OR21400. 127p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86014410.

Multiple regression analyses were performed on capital cost data for nuclear and coal-fired power plants in an extension of an earlier study which indicated that nuclear units completed prior to the accident at Three-Mile Island (TMI) have no economy of scale, and that units completed after that event have a weak economy of scale (scaling exponent of about 0.81). The earlier study also indicated that the scaling exponent for coal-fired units is about 0.92, compared with conceptual models which project scaling exponents in a range from about 0.5 to 0.9. Other empirical studies have indicated poor economy of scale, but a large range of cost-size scaling exponents has been reported. In the present study, the results for nuclear units indicate a scaling exponent of about 0.94 but with no economy of scale for large units, that a first unit costs 17% more than a second unit, that a unit in the South costs 20% less than others, that a unit completed after TMI costs 33% more than one completed before TMI, and that costs are increasing at 9.3% per year. In the present study, the results for coal-fired units indicate a scaling exponent of 0.93 but with better scaling economy in the larger units, that a first unit costs 38.5% more, a unit in the South costs 10% less, flue-gas desulfurization units cost 23% more, and that costs are increasing at 4% per year.

47617 (ORNL/TM—10071) **Cost estimate guidelines for advanced nuclear power technologies.** Hudson, C.R. II. (Oak Ridge National Lab., TN (USA). Engineering Technology Div.). Jul 1986. Contract AC05-84OR21400. 101p. NTIS, PC A06/MF A01; GPO Dep. File Number DE86014412.

To make comparative assessments of competing technologies, consistent ground rules must be applied when developing cost estimates. This document provides a uniform set of assumptions, ground rules, and requirements that can be used in developing cost estimates for advanced nuclear power technologies.

22 NUCLEAR REACTOR TECHNOLOGY

2201 Theory And Calculation

47618 (AEEW-R—1962) **Subgroup version of MONK.** Hutton, J.L. (UKAEA Atomic Energy Establishment, Winfrith). Jul 1985. 26p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703178.

The Monte Carlo neutronics code MONK is used for a wide range of applications from criticality to reactor modelling. To extend the range and to remove a limitation of the group data version of the code, the subgroup method has been combined into MONK. This note outlines the basis of the subgroup model adopted for this development, together with the results of a series of validation/verification calculations designed to demonstrate the accuracy and usefulness of this development.

47619 (JAERI-M—84-219) **Calculation of critical parameters for uranium and/or plutonium nitrate solution, 2. Discussion of basic critical parameters for nitrate solution system.** Miyoshi, Yoshinori; Ami, Norio; Tachimori, Shoichi. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Dec 1984. 62p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. File Number DE86703180.

For the purpose of criticality experiments of the nitrate solution systems composed of uranium and/or plutonium, the designs of Criticality Safety Experimental Facility(CSEF) are under-going in JAERI. In this report, by using the developed calculational code for the atomic number density of the nitrate solution of U/Pu mixture, the ratio H/Fissile has been calculated as a function of fuel concentration and acidity. Critical parameters such as infinite multiplication factor, effective multiplication factor, and the critical diameter of infinite cylinder have been evaluated with Monte Carlo code KENO-IV of JACS system. The dependence of multiplication factors on the formula for the atomic number density is described by comparing the calculated results with our formula and those with ARH-600 formula. Based on our formula, the effects of acid molality and Plutonium valence state on the criticality of nitrate solution have been discussed.

47620 (JAERI-M—85-034) **Collision probability in two-dimensional lattice by ray-trace method and its applications to cell calculations.** Tsuchihashi, Keichiro. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 217p. NTIS (US Sales Only), PC A10/MF A01. File Number DE86703182.

A series of formulations to evaluate collision probability for multi-region cells expressed by either of three one-dimensional coordinate systems (plane, sphere and cylinder) or by the general two-dimensional cylindrical coordinate system is presented. They are expressed in a suitable form to have a common numerical process named "Ray-Trace" method. Applications of the collision probability method to two optional treatments for the resonance absorption are presented. One is a modified table-look-up method based on the intermediate resonance approximation, and the other is a rigorous method to calculate the resonance absorption in a multi-region cell in which nearly continuous energy spectra of the resonance neutron range can be solved and interaction effect between different resonance nuclides can be evaluated. Two works on resonance absorption in a doubly heterogeneous system with grain

structure are presented. First, the effect of a random distribution of particles embedded in graphite diluent on the resonance integral is studied. Next, the "Accretion" method proposed by Lealie and Jonsson to define the collision probability in a doubly heterogeneous system is applied to evaluate the resonance absorption in coated particles dispersed in fuel pellet of the HTGR. Several optional models are proposed to define the collision rates in the medium with the microscopic heterogeneity. By making use of the collision probability method developed by the present study, the JAERI thermal reactor standard nuclear design code system SRAC has been developed. Results of several benchmark tests for the SRAC are presented. The analyses of critical experiments of the SHE, DCA, and FNR show good agreement of critical masses with their experimental values.

47621 **(ORNL/TM—9860) Discussion about modeling the effects of neutron flux exposure for nuclear reactor core analysis.** Vondy, D.R. (Oak Ridge National Lab., TN (USA). Engineering Physics and Mathematics Div.). Apr 1986. Contract AC05-84OR21400. 90p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86010077.

Methods used to calculate the effects of exposure to a neutron flux are described. The modeling of the nuclear-reactor core history presents an analysis challenge. The nuclide chain equations must be solved, and some of the methods in use for this are described. Techniques for treating reactor-core histories are discussed and evaluated.

47622 **(SAND—86-0335C) Recent developments in discrete-ordinates electron transport.** Morel, J.E.; Lorence, L.J. Jr. (Los Alamos National Lab., NM (USA). Applied Theoretical Physics Div.; Sandia National Labs., Albuquerque, NM (USA). Simulation Theory Div.). 1986. Contract AC04-76DP00789. 6p. (CONF-860610—24). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86007827.

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

The computational state-of-the-art for coupled electron-photon transport (CEPT) calculations is not as developed as that for neutron transport calculations. The only production codes currently available for CEPT calculations are condensed-history Monte Carlo codes such as ETRAN and the ITS codes. A deterministic capability for production calculations is clearly needed. In response to this need, the development of a production discrete-ordinates code for CEPT calculations is described. The purpose of this paper is to describe the basic approach which is being taken, discuss the current status of the project, and present some new computational results.

2202 Components And Accessories

REFER ALSO TO CITATION(S) 47710, 47711, 47726, 47912, 47949, 48251, 48297

47623 **(EPRI-NP—4625) Laboratory examinations of selected tubes from test facilities of the Steam Generator Owners Group. Final report.** Prestegiacomo, J.B.; Jacko, R.J. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Steam Generator Technology Div.). Jul 1986. 277p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920432.

This report documents work conducted to evaluate alloy 600 tubing under tube supports tested in SGOG I projects. The majority of tube-tube support specimens were exposed to denting-type environments. Evaluation of these specimens revealed only superficial tube attack, including surface roughening, pitting, and intergranular penetrations (in decreasing order of frequency). Concurrently, an in-depth investigation, including microstructural and microanalytical evaluations and previously reported data, concluded that nonsensitized thermally treated alloy 600 tubing cracked in a sulfate environment that also caused wastage. Of the factors considered in this work, i.e., chemical environment, tubing microstructure, and mechanical effects, the mechanical component (dynamic plastic straining during test) may have had the greatest contribution relative to promoting stress corrosion cracking (SCC) in the tubing. 93 figs., 33 tabs.

47624 **(EPRI-NP—4665-S-SR) Workshop on thermally treated alloy 690 tubes for nuclear steam generators: proceedings.** Shoemaker, C.E.; Cordovi, M.; Stein, A.A. (eds.). (Electric Power Research Inst., Palo Alto, CA (USA); Stone and Webster Engineering Corp., Boston, MA (USA)). Jul 1986. 523p. (CONF-8606180—). Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920431.

From Workshop on thermally treated alloy 690 tubes for nuclear steam generators; Pittsburgh, PA, USA (26 Jun 1986).

The workshop was held to collect available metallurgical and corrosion data on thermally treated (TT) alloy 690 and to compare these data with that for other candidate tube alloys for nuclear steam generators. The data indicate that TT alloy 690 is the most corrosion-resistant tube alloy. It is immune to stress corrosion cracking (SCC) in primary water, chlorides and sulfates. The TT improves its corrosion resistance to caustic, the most corrosive environment. Manufacturing parameters for alloy 690 tubing are little different than for alloy 600 except that higher mill-annealing temperatures are required. Some optimization of annealing parameters and some additional corrosion testing are needed to complete the qualification of alloy 690.

47625 **(EPRI-NP—4705) Electrochemistry and corrosion of alloys in high-temperature water. Final report.** Bogaerts, W.F.; Bettendorf, C. (Leuven Univ. (Belgium). ECHEM Labs.). Jul 1986. 161p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920435.

The effect of potential and temperature on the passivity and its localized breakdown on nickel base alloys in dilute aqueous solutions has been studied at temperatures ranging from 50 to 300°C, emphasizing the role of environmental variables, such as temperature, solution composition (e.g. Cl^-) and pH. A critical potential, above which passivity breakdown and/or pitting occurs, has been determined as a function of temperature. Changes in pitting morphologies and growth kinetics are discussed in terms of surface film compositions and electrochemical properties. Some specific features of high temperature pits (e.g. IGA at pit bottoms) are explained. The report also presents a preliminary survey of the chemistry of surface films formed on Fe-Cr-Ni alloys in high temperature aqueous environments and suggests possible mechanisms underlying corrosion behavior of Alloy 600 or Type 304 stainless steel in these media.

47626 **(EUR—9595) Characterization and improvement of coatings protecting concrete against contamination.** Bernard, A.; Gerland, H. (Commission of the European Communities, Luxembourg). 1985. 33p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750857.

A new type of coatings has been developped for the protection of concrete structures which simplifies the dismantling of nuclear power reactors and decreases the riaks of getting a huge volume of wastes. These coatings are decontaminable, resistant, adherent and, if necessary, strippable. They usually consist of composite systems, in order to perfectly fulfill the often contradicting functions. This made difficult the development of such a material. Different tests have been performed on many systems using such a type of painting: decontamination test (standard NF T 30 901), artificial aging (standard NF T 30 049), peeling tests, chemical corrosion tests. Some of these coatings have been selected. Each of them is an example of a given configuration - one layer strippable coating, composite system, etc... Many other coatings although not reported, gave encouraging results. Although in apparent contradiction with the present subject, an other property of these removable coatings has been studied, namely the fixing of contamination. This could also give interesting results. A prototype of such a coating has been qualified. We also present here a device developed by the STMI company. This device would allow taking off the contaminated coatings in case of a problem with the normal removal. Using peeling coatings in the Nuclear Power Reactors in the CEE seems to be an interesting possibility for the future.

47627 **(NUREG/CP—0065) Transactions of the 8th International Conference on Structure Mechanics in Reactor Technology.** Browzin, B.S. (comp.). (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). Jun 1985. 262p. (CONF-850809—EXC.). NTIS, PC A12/MF A01 - GPO. File Number TI85901725.

From 8. international conference on structural mechanics in reactor technology; Brussels, Belgium (19 Aug 1985).

These Transactions of the JK-panel session include preprints of papers or abstracts which are listed in Volume A, "Introduction, General Contents, Authors Index," Proceedings of the 8th International Conference on Structural Mechanics in Reactor Technology. These papers represent the body of the JK-panel session, "Status of Research in Structural and Mechanical Engineering for Nuclear Power Plants," sponsored by the US Nuclear Regulatory Commission. Additional papers are expected at this session, which will be available at the session. The purpose of publishing these Transactions is to inform the participants of the JK-panel session in advance on the papers to be presented and discussed at the session.

2203 Fuel Elements

REFER ALSO TO CITATION(S) 47273

47628 **(BARC—1276) Environment induced cracking of Zircaloy-2 fuel cladding tube.** Ghosal, S.K.; De, P.K. (Bhabha Atomic Research Centre, Bombay (India); Bhabha Atomic Research Centre, Bombay (India). Metallurgy Div.). 1985. 14p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703183.

The influence of iodine vapour on the stress corrosion cracking (SCC) behaviour of Zircaloy-2 fuel cladding tubes has been studied. SCC tests have been carried out by internal pressurisation technique in the temperature range of 300-400degC, with applied stress varying from 16-37 kg/mm^2. The iodine concentration was varied from 1 mg/cm^2 to 10 mg/cm^2 of the exposed surface of Zircaloy tubes. Time-of-failure of the stress-relieved tubes was found to be strongly dependent on iodine concentration, temperature and applied hoop stress. The time-to-failure was found to increase from 6 minutes to 10 hours as the iodine concentration was decreased from 10 mg/cm^2 to 1 mg/cm^2. Similarly with 1 mg/cm^2 iodine, the time-to-failure was increased by about 20 times by lowering the temperature from 400degC to 300degC. It has been observed that for the tube to fail by SCC, applied hoop stress should be around the yield stress of the material. Experiments under similar conditions were also carried out with graphite coated (inside surface only - CANLUB) Zircaloy-2 tubes. Results indicated that graphite coated tubes are more resistant to SCC as compared to the bare tubes. In order to find the SCC behaviour of the Zircaloy-2 tubes under power ramp condition, SCC tests were also carried out in which the temperature was increased suddenly from 300degC to 500degC. It was found that the life time of the graphite coated tubes is about 1.5 times longer than that of the bare tubes. SEM examination showed the presence of corrosion products at the inside surface of tubes failed by SCC. The mechanism of failure appears to be one of mechanical fracture assisted by chemical attack. In the presence of iodine, preoxidised tubes had increased the life time, but the hydrided tubes failed within a very short time. Presence of cadmium has been observed to be harmful. 27 refs., 4 tables, 10 figures.

47629 **(INIS-mf—10197) Annual meeting on nuclear technology 1981. Technical meeting: Fuel elements and fuel element materials.** (Deutsches Atomforum e.V., Bonn (Germany, F.R.)). 1981. 99p. (In German). (CONF-810326—). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752596.

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

The papers deal with impaired properties of actinide mixes in LWR and BWR fuel, with fabrication methods for fuels containing Pu, with U/Pu and Th/U fuels and related waste management, the state of Pu fuel use in LWR-type reactors. Additionally, the state of art in mechanical decladding of SNR-300 mixed oxide fuel rods with lattice spaces is described. The six papers are indexed separately in the data base.

2204 Control Systems

REFER ALSO TO CITATION(S) 47612, 47665, 47669

47630 **(BMI—1985-096) System of computer-aided tools supplying data for assessment and prognosis to assist operators to comply with the duty of notification in the event of nuclear emergencies. Final report.** Felkel, L.; Gueldner, W.; Kersting, E.; Risse, D.; Schweigert, J.; Seel, H.R.; Spindler, H.; Wiesemes, J. (Bundesministerium des Innern, Bonn (Germany, F.R.); Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Garching (Germany, F.R.)). Dec 1985. 124p. (In German). (GRS-A—1058). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752610.

Schriftenreihe Reaktorsicherheit und Strahlenschutz. Ergebnisberichte, Untersuchungen, Studien, Gutachten.

A prerequisite of making prognostic statemets on possible developments of an accident in a nuclear facility is a sound knowledge of the state of the safety system, exact classification of the type of disturbance, and monitoring of system response by means of the design parameters. The report under review presents an outline of a computer-aided system, OPSYS, providing data required to cope with such a situation. A scheme of stages is proposed, every stage describing the topical operating conditions of the plant and the "distance" to the crucial phase where accident developments would reach a point at which the emergency could no longer be mastered by the active safety systems available in the plant. Disturbance classification is achieved by means of signals being coordinated to various disturbance types by a matrix method. Plant systems response is monitored by a procedure guided by the prune objective, to provide the protection needed and planned for. Prognostic statements are derived taking into account data on pre-calculated characteristic events as it seems to require too high an effort to provide for a plant simulator on site. Suggestions are made regarding further studies within the project framework, for broader application of OPSYS.

47631 (CONF-860102—Summs., pp MM-6.1-MM-6.3) **Application of reflected kinetics to nuclear space reactor scoping studies.** Washing, K.E.; Schlapper, G.A. (Texas A and M Univ., College Station). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

One of the most important considerations in using nuclear reactors in space is that of reactor kinetics and control. A unique control environment exists due to the replacement of control rods with reflecting control drums in most space reactor designs. The objective of this paper is to present a model of a multireflected space reactor that will accurately describe the transient response of the system and can be used in the development of a multivariable automatic controller. Open loop sensitivity studies done with the RK model, has qualitatively reproduced expected responses with minimal computational effort. When the linearized model is coupled to an automatic controller, the resulting closed loop system can be used to demonstrate that a proposed design can (or cannot) deliver the requested power responses. The success of the model under analysis was found to be a strong function of the controller. Details of the controller designs and their implications on closed loop system performances are discussed in the final paper.

47632 **(EPRI-NP—4483-Vol.1) Improved reliability for analog instrument and control systems. Volume 1. Failure analysis and demonstration module. Final report.** Mayo, C.W.; Caruthers, S.J.; Lagerberg, G.N.; Mason, C.L.; Minarick, J.W.; Roberts, R.C. (Science Applications International Corp., Oak Ridge, TN (USA)). May 1986. 89p. Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303. File Number TI86920263.

Nuclear plant instrument and control module and power supply performance was analyzed to identify reliability and drift improvements that can reduce the incidence of plant trips and re-

portable drift. In-service module and power supply performance was evaluated and potential improvements were defined based on the use of present generation, high reliability electronic components. A demonstration analog module and power supply were designed, fabricated, and tested to demonstrate available improvements. The application of electronic reliability prediction analysis, modern electronic component performance, and established reliability military grade parts were shown to offer order of magnitude improvements in instrument and control module accuracy and failure rate. This report provides the final results for EPRI project RP2409-2.

47633 **(INIS-mf—10188) Annual meeting on nuclear technology 1982. Technical meeting: Information processing in nuclear engineering.** (Deutsches Atomforum e.V., Bonn (Germany, F.R.)). 1982. 99p. (In German). (CONF-8205205—). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752575.

From Meeting on nuclear technology; Mannheim, F.R. Germany (4 May 1982).

Contributions include a survey of plant control technology, in particular that of KWU's PWR-type reactors, compacter-aided operator support, the protecting computer system MIRA which was developed at the KfK as well as the ATOG system which is based on the experience gained from the TMI II incident.

47634 (INIS-mf—10188, pp 1-32) **Control technology in a nuclear power plant and its significance for reactor safety.** Aleite, W. (Kraftwerk Union A.G., Erlangen, Germany, F.R.). 1982. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752575. (CONF-8205205—).

From Meeting on nuclear technology; Mannheim, F.R. Germany (4 May 1982).

Comprehensive survey of information processing in the safety-relevant part of control technology in a nuclear power plant with respect to common practice and to projects in the near future with KWU's PWR-type reactors.

47635 (INIS-mf—10188, pp 33-50) **Computer-aided operator support in nuclear power plants.** Bastl, W. (Gesellschaft fuer Reaktorsicherheit m.b.H., GRS, Garching, Germany, F.R.). 1982. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752575. (CONF-8205205—).

From Meeting on nuclear technology; Mannheim, F.R. Germany (4 May 1982).

With the control panel concepts presently being developed, the use of VDU's is emphasized to reduce the member of conventional indicators. By displaying systems wiring diagrams with mixed-in measured data and components statuses, diagrams, comparison tables, etc, far more information can be conveyed with no loss of distinctions. Recently presented integral systems show a basic concept enabling the use of various computer aided operator supports. However, a lot of development work will be necessary with respect to its efficient use.

47636 (INIS-mf—10188, pp 51-78) **Method for the development of reliable software for computer-aided safety systems.** Trauboth, H.; Voges, U. (Kernforschungszentrum Karlsruhe G.m.b.H., Germany, F.R. Inst. fuer Datenverarbeitung in der Technik). 1982. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752575. (CONF-8205205—).

From Meeting on nuclear technology; Mannheim, F.R. Germany (4 May 1982).

Survey of the tasks of a computer-aided safety system, the peculiarities of software development, the great number of measures and methods presently used to reach a high degree of reliability of the software in nuclear engineering. The design methods to be employed during the various stages of development are indicated by the example of the protecting computer system MIRA (microprocessor controlled reactor shutdown system). The various analytic methods and related tools for testing and verification of extremely reliably software are described in brief.

47637 (INIS-mf—10188, pp 79-97) **ATOG - a status oriented method for dealing with accidents.** Day, B.L.; Wirtz, P.H.; Kelly, J.J. Jr. (Brown, Boveri und Cie A.G., Mannheim, Germany, F.R.; Babcock and Wilcox Co., Lynchburg, VA, USA). 1982. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752575. (CONF-8205205—).

From Meeting on nuclear technology; Mannheim, F.R. Germany (4 May 1982).

Based on the experience gained in the TMI-II accident and due to the fact that today's operating manuals are of no use with very complex accident combinations and do not cover all conceivable cases, the status-oriented method for dealing with accidents was developed. The preeminent goal of this method is the treating of accidents by symptoms which is to enable a stable and safe plant status as quickly as possible without the necessity of unanimous diagnosis of the cause of trouble.

47638 **(JAERI-M—85-032) Measurements and analyses on reactivity effects of absorber rods in a light-water moderated UO_2 lattices.** Murakami, Kiyonobu; Miyoshi, Yoshinori; Hirose, Hideyuki; Suzaki, Takenori. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 23p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703181.

Reactivity effects and reactivity-interference effects of absorber rods were measured with a cylindrical core aiming to obtain bench-marks for verification of the calculational methods. The core consisted of 2.6 w/o enriched UO_2 fuel rods lattice of which water-to-fuel volume ratio was 1.83. In the experiment, the critical water levels were measured changing neutron absorber content of absorber rods and the distance between two absorber rods in the core center. Monte Calro codes KENO-IV and MULTI-KENO were used to calculate reactivity worthes of absorber rods. The calculational results of effective multiplication factors ranged from 0.978 to 0.999 for the 60 cases of critical cores with inserted absorber rods. The calculational results of absorber worthes agreed to the experimental results within twice of the standerd deviation accompanied with the Monte Calro calculation.

47639 **(NUREG—1220) Training review criteria and procedures.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Human Factors Technology). Jul 1986. 121p. NTIS, PC A06/MF A01. File Number TI86901578.

The industry, through commitment to the INPO-managed Training Accreditation Program, is implementing what is referred to as performance-based training, or the Systems Approach to Training (SAT). The NRC considers the following five elements as essential to these training programs: Systematic analysis of the jobs to be performed; learning objectives that are derived from the analysis and that describe desired performance after training; Training design and implementation based on the learning objectives; Evaluation of trainee mastery of the objectives during training; and evaluation and revision of the training based on the performance of trained personnel in the job setting. As indicated in the "Commission Policy Statement on Training and Qualifications of Nuclear Power Plant Personnel" of March 20, 1985,"the NRC will continue to closely monitor the process [INPO Accreditation] and its results, and "It remains the continuing responsibility of the NRC to independently evaluate applicants' and licensees' implementation of improvement programs...." These procedures provide a systematic means for implementing two of the NRC monitoring functions identified in the Commission Policy Statement: "Continuing evaluation of industry training and qualification program effectiveness,"; and "Monitoring plant and industry trends and events involving personnel errors."

47640 **(NUREG/CR—4532-Vol.1) Models of cognitive behavior in nuclear power plant personnel. A feasibility study: summary of results. Volume 1.** Woods, D.D.; Roth, E.M.; Hanes, L.F. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center). Jul 1986. 27p. NTIS, PC A03/MF A01 - GPO. File Number TI86901610.

This report summarizes the results of a feasibility study to determine if the current state of models of human cognitive activities can serve as the basis for improved techniques for predicting human error in nuclear power plants emergency operations. Based on the answer to this question, two subsequent phases of research are planned. Phase II is to develop a model of cognitive activities, and Phase III is to test the model. The feasibility study included an analysis of the cognitive activities that occur in emergency operations and an assessment of the modeling concepts/tools available to capture these cognitive activities. The results indicated that a symbolic processing (or artificial intelligence) model of cognitive activities in nuclear power plants is both desirable and feasible. This cognitive model can be built upon the computational framework provided by an existing artificial intelligence system for medical problem solving, called Caduceus. The resulting cognitive model will increase the capability to capture the human contribution to risk in probabilistic risk assessment studies. Volume 1 summarizes the major findings and conclusions of the study. Volume 2 provides a complete description of the methods and results, including a synthesis of the cognitive activities that occur during emergency operations, and a literature review on cognitive modeling relevant to nuclear power plants. 19 refs.

47641 (NUREG/CR—4532-Vol.2) **Models of cognitive behavior in nuclear power plant personnel. A feasibility study: main report. Volume 2.** Woods, D.D.; Roth, E.M.; Hanes, L.F. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center). Jul 1986. 178p. NTIS, PC A09/MF A01 - GPO. File Number TI86901611.

This report contains the results of a feasibility study to determine if the current state of models human cognitive activities can serve as the basis for improved techniques for predicting human error in nuclear power plants emergency operations. Based on the answer to this questions, two subsequent phases of research are planned. Phase II is to develop a model of cognitive activities, and Phase III is to test the model. The feasibility study included an analysis of the cognitive activities that occur in emergency operations and an assessment of the modeling concepts/tools available to capture these cognitive activities. The results indicated that a symbolic processing (or artificial intelligence) model of cognitive activities in nuclear power plants is both desirable and feasible. This cognitive model can be built upon the computational framework provided by an existing artificial intelligence system for medical problem solving called Caduceus. The resulting cognitive model will increase the capability to capture the human contribution to risk in probabilistic risk assessments studies. Volume I summarizes the major findings and conclusions of the study. Volume II provides a complete description of the methods and results, including a synthesis of the cognitive activities that occur during emergency operations, and a literature review on cognitive modeling relevant to nuclear power plants. 112 refs., 10 figs.

2205 Environmental Aspects

REFER ALSO TO CITATION(S) 47195, 47728, 47729, 48599, 48719, 48769

47642 (CONF-841187—Vol.2, pp 607-619) **Remote sensing of wetlands at the Savannah River Plant.** Christensen, E.J.; Jensen, J.R.; Sharitz, R.R. (Univ. of South Carolina, Columbia). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC09-76SR00001.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Savannah River Plant (SRP) occupies about 300 sq mi along a 10-mile stretch of the Savannah River. Large areas of wetlands cover the site, especially along tributary stream floodplains and the Savannah River. Some of these areas have been altered by cooling water discharges from nuclear production reactors onsite. To assess the effects of current and future plant operations on SRP and regional wetlands, an accurate quantitative survey was needed. Several studies were initiated to provide wetland acreage and distribution information: regional wetland inventories were provided from an analysis of LANDSAT multispectral scanner (MSS) satellite data. Wetlands were mapped throughout the entire Savannah River watershed and in the Savannah River floodplain. SRP wetlands were identified using a combination of LANDSAT MSS and Thematic Mapper satellite data and aerial photography. Wetlands in the SRP Savannah River swamp and thermally affected areas were mapped using high resolution MSS data collected from a low-flying aircraft. Vegetation communities in areas receiving cooling water discharges were then compared to surface temperatures measured from the airborne scanner at the same time to evaluate plant temperature tolerance. Historic changes to SRP wetlands from cooling water discharges were tabulated using aerial photography.

47643 (CONF-841187—Vol.2, pp 737-745) **Agency interaction at the Savannah River Plant under the Endangered Species Act.** Mackey, H.E. Jr. (Savannah River Lab., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC09-76SR00001.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The 300 square mile Savannah River Plant (SRP) offers a variety of protected habitats for endangered species including the alligator (resident), red-cockaded woodpecker (resident), short-nose sturgeon (migratory), and wood stork (fish-forager). The most recent of these four species to be listed by the US Fish and Wildlife Service (US FWS) is the wood stork. It had been observed prior to 1983 as an infrequent forager in the SRP Savannah River Swamp which adjoins SRP on the south and southwest. In anticipation of its listing as an endangered species, DOE-SR requested in the spring of 1983 that the Savannah River Ecology Laboratory, University of Georgia, conduct field surveys and studies of the nearest colony of wood storks to SRP (the Birdsville colony in north-central Georgia). The objective of these studies was to determine potential effects of the flooding of the Steel Creek swamp area with cooling water from L-Reactor. L-Reactor, which is proposed for restart, has not been operated since 1968. The survey found that wood storks forage in the Steel Creek delta swamp area of the Savannah River at SRP. Based on the numbers of storks at various foraging locations, sites at SRP ranked higher than non-SRP sites during the pre-fledging phase of the colony. Cold flow testing of L-Reactor also demonstrated that foraging sites in the Steel Creek delta would be unavailable during L-Reactor operation because of increased water levels.

47644 (PNL—5870) **Method for assigning sites to projected generic nuclear power plants.** Holter, G.M.; Purcell, W.L.; Shutz, M.E.; Young, J.R. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 54p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014191.

Pacific Northwest Laboratory developed a method for forecasting potential locations and startup sequences of nuclear power plants that will be required in the future but have not yet been specifically identified by electric utilities. Use of the method results in numerical ratings for potential nuclear power plant sites located in each of the 10 federal energy regions. The rating for each potential site is obtained from numerical factors assigned to each of 5 primary siting characteristics: (1) cooling water availability, (2) site land area, (3) power transmission land area, (4) proximity to metropolitan areas, and (5) utility plans for the site. The sequence of plant startups in each federal energy region is obtained by use of the numerical ratings and the forecasts of generic nuclear power plant startups obtained from the EIA Middle Case electricity forecast. Sites are assigned to generic plants in chronological order according to startup date.

2206 Research, Test, And Experimental Reactors

REFER ALSO TO CITATION(S) 47316, 47666, 49642

47645 (DOE/ER/04207—18) **Texas A and M University Nuclear Science Center. Twenty-second progress report, January 1-December 31, 1985.** Anderson, D.G.; Jeffords, E.L.; Krohn, J.L.; Petesch, J.E.; Stasny, G.S. (Texas A and M Univ., College Station (USA). Texas Engineering Experiment Station). Mar 1986. Contract AC05-76ER04207. 98p. (ORO—4207-18). NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86010291.

Reactor utilization decreased from 1984 as indicated by a smaller number of samples irradiated and of total irradiations. In addition there was a decrease in megawatt-days of reactor operation and the number of hours at steady state. There was also a large decrease in the total number of experiments hours. The observed trend in reactor utilization appears to be a result of the reduced operating schedule begun in September, 1983, new price increases for services effective in January, 1985, and the slowdown in the oil industry over the past few years. A program with the International Atomic Energy Agency for developing and testing computer software for use at research reactors was continued in 1985. Core VIII, which has been operational since December 1982, was used throughout 1985. Pulse operations were reinitiated in February 1983 for the first time since 1976, and a total of 113 pulses ($466.90 total pulse reactivity) were executed in 1985. Several major facility projects, modifications, and improvements were completed during the past year. A new control rod positioning method was developed and installed on shim safety rods 1 and 4 with the remainder of rods to be completed in 1986, and improvements were made to the liquid waste handling system. Several operational problems occurred in 1985 but did not result in a significant loss of reactor operating time. The secondary cooling pump motor had to be replaced, and instrumentation age also was a factor in some repair down-time. During this reporting period there were no changes made to the site area; however, work continued on extension of the runway at nearby Easterwood Airport. This extension should be completed in 1986 but should have no affect on the air traffic patterns relative to the NSC.

47646 **(DOE/ER/10229—23) University of Wisconsin Nuclear Reactor Laboratory, Madison, Wisconsin. Annual report, fiscal year 1985-1986.** Cashwell, R.J. (Wisconsin Univ., Madison (USA). Nuclear Reactor Lab.). 1986. Contract FG02-81ER10229. 13p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014352.

This report presents a summary of the operations and programs carried out for the University of Wisconsin Nuclear Reactor Laboratory for the fiscal year 1985-1986. Information is presented on: instructional use - UW-Madison formal classes; reactor sharing program; utility personnel training; sample irradiations and neutron activation analysis services; changes in personnel, facility, and procedures; and results of surveillance tests.

47647 **(EGG-M—22985) Irradiation facilities at the Idaho National Engineering Laboratory.** Gupta, V.P.; Herring, J.S.; Korenke, R.E.; Harker, Y.D. (EG and G Idaho, Inc., Idaho Falls (USA)). 1986. Contract AC07-76ID01570. 24p. (CONF-860605—18). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013469.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

Although there is a growing need for neutron and gamma irradiations by governmental and industrial organizations in the United States and in other countries, the number of facilities providing such irradiations are limited. At the Idaho National Engineering Laboratory, there are several unique irradiation facilities producing high neutron and gamma radiation environments. These facilities could be readily used for nuclear research, materials testing, radiation hardening studies on electronic components/circuitry and sensors, and production of neutron transmutation doped (NTD) silicon and special radioisotopes. In addition, a neutron radiography unit, suitable for examining irradiated materials and assemblies, is also available. This paper provides a description of the irradiation facilities and the neutron radiography unit as well as examples of their unique applications.

47648 **(JAERI-M—85-016) Study on evaluation methods of explosive proof tests of NSRR capsule.** Yamazaki, Toshi. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 53p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. File Number DE86703193.

This report describes the methods of evaluation of chemical explosive tests results in NSRR. The report is composed of the requirements for NSRR capsule design, the methods for chemical explosive tests, the existing evaluation method and a proposal for a new method of evaluation of explosive proof test results.

47649 **(JAERI-M—85-021) Development of the power ramping facility at JMTR. Results of performance test on the boiling water capsule.** Nakata, Hirokatsu; Sezaki, Katsuji; Nakazaki, Chosaburo; Ishii, Tadahiko; Ito, Haruhiko; Abe, Hiroshi. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Oarai, Ibaraki. Oarai Research Establishment). Mar 1985. 40p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. File Number DE86703194.

The LWR fuel power ramping facility have been being developed at JMTR since 1978. This report, following previous reports, JAERI-M 8533 and 9343, summarizes the results of performance test performed in 1981 on the ^{3}He power controlled boiling water capsule, which is a basic part of the facility. Various measurements were carried out during reactor operation on each part of the capsule, i.e. capsule itself, capsule control unit and ^{3}He power control unit, after a long-time cold run test of the units. Through the test, it was confirmed that the capsule satisfies the specifications which stated that LWR fuel pin should be power-ramped under BWR conditions up to 50 kW/m with a change factor of more than 2, and that the control units operate in a good condition.

47650 **(UVA—527277/NEEP84/102) Participation in the United States Department of Energy Reactor Sharing Program. Annual report, September 1982-August 1983.** Brenizer, J.S.; Benneche, P.E. (Virginia Univ., Charlottesville (USA). Research Labs. for the Engineering Sciences). Mar 1984. Contract FG05-80ER10733. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014861.

The University of Virginia Reactor Facility is an integral part of the Department of Nuclear Engineering and Engineering Physics and is used to support educational programs in engineering and science at the University of Virginia and at other area colleges and universities. The University of Virginia Research Reactor (UVAR) is the highest power (two megawatts thermal power) and most utilized (total power production in 1982 was over 5500 megawatt-hours) research reactor in the mid-Atlantic states. In addition, a second, small (50 watt) reactor is also available for use in educational and research programs. A major objective of this facility is to expand its support of educational programs in the region. The University of Virginia has received support under the US Department of Energy (DOE) Reactor Sharing Program every year since 1978 to assist in meeting this objective. This report documents the major educational accomplishments under the Reactor Sharing Program for the period September 1982 through August 1983.

2207 Plutonium And Isotope Production Reactors

REFER ALSO TO CITATION(S) 47646

47651 **(DPST—85-1-11) Savannah River Laboratory monthly report, November 1985.** (SEE CODE- 9520932 Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Nov 1985. Contract AC09-76SR00001. 18p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008913.

This report presents information concerning: nuclear reactors and scientific computations; chemical processes and environmental technology; and defense waste and laboratory operations for the Savannah River Laboratory. (JDB)

47652 **(DPST—86-1-1) Savannah River Laboratory monthly report, January 1986.** (SEE CODE- 9520932 Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jan 1986. Contract AC09-76SR00001. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008909.

This report presents information concerning: nuclear reactors and scientific computations; chemical processes and environmental technology; and defense waste and laboratory operations for the Savannah River Laboratory. (JDB)

2209 Reactor Safety

REFER ALSO TO CITATION(S) 47630, 47633, 47634, 47636, 47637, 47640, 47641, 48252, 48298, 49639

47653 (AEEW-R—1874) BERTHA: a programme for the thermal/hydraulic analysis of reflooding experiments. Pearson, K.G.; Cooper, C.A. (UKAEA Atomic Energy Establishment, Winfrith). Apr 1985. 100p. (PWR/HTWG/P—85-311). NTIS (US Sales Only), PC A05/MF A01. File Number DE86703189.

In the event of a large break loss-of coolant accident in a PWR the normal cooling would be restored by reflooding the dry overheated reactor core from below. A model, BERTHA, of heat transfer in this dry region is presented. It includes a film boiling and dispersed flow region and explicitly represents the effect of spacer grids. In parallel channel mode it can calculate the effect of partial flow blockage. Predictions of the model are compared with experimental data and show good agreement in both blocked and unblocked configurations.

47654 (AEEW-R—1933) Mathematical model of vapour film destabilisation. Knowles, J.B. (UKAEA Atomic Energy Establishment, Winfrith). Apr 1985. 74p. NTIS (US Sales Only), PC A04/MF A01. File Number DE86703166.

In a hypothetical reactor accident, destabilisation of an intervening vapour film between the molten fuel and liquid coolant by a weak shock wave (trigger), is considered likely to initiate the molten fuel-coolant interaction. The one-dimensional model presented here is part of a larger programme of fundamental research aimed at improved reactor safety.

47655 (BMI—1985-098) Description of an improvement concept to prevent overpressure containment rupture. Final report. Covelli, B. (Bundesministerium des Innern, Bonn (Germany, F.R.)). Dec 1985. 47p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE86752605.

Schriftenreihe Reaktorsicherheit und Strahlenschutz. Ergebnisberichte, Untersuchungen, Studien, Gutachten.

This report summarizes results of experiments and recommendations for design improvements, shown by the example of a standard PWR-type system designed in Western Germany. The design improvements are intended to allow safe handling of the hydrogen problem and prevention of undue pressure built-up in the containment. Dimensions and design data are given of the technical components in order to present a realistic view of the measures to be taken for accident prevention. The measures described have been tested and proved to afford optimal advances with regard to prevention of a hydrogen explosion, by inerting with Halon; controlled venting, by means of an open filtering system with head-end blow-off condenser; after-heat removal, by an appropriately dimensioned blow-off condenser, or by means of an additional external spray cooling system.

47656 (BNL-NUREG—37691) Systematic approach to containment performance criteria. Park, C.; Bari, R.; Kerr, W. (Brookhaven National Lab., Upton, NY (USA). Nuclear Energy Dept.). 1986. Contract AC02-76CH00016. 5p. (CONF-860610—16). NTIS, PC A02/MF A01 - GPO. File Number TI86007123.

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

The objective of this study is to demonstrate how to specify containment performance criteria in a systematic way given top level safety goals. The multiobjective optimization approach proposed by Cho, et al. was adopted as a method for deriving a finite manageable set of self-consistent relations between the top level safety goals and specific sets of measures of containment performance. The current trial safety goals proposed by the NRC goes from a design objective figure of 10^{-4} for annual frequency of core melt to guideline numbers for early fatalities and for delayed fatalities. An alternative is to specify containment system performance in some quantitative fashion. If this can be done, and if the specified performance can be demonstrated with some reasonable level of confidence, it will help to provide greater consistency between top level safety goals (health risk indices) and lower level design objectives (plant performance indices, i.e., core melt frequency and containment performance criteria).

47657 (CLM-R—256) Transient debris bed calculations in one dimension. Brealey, N.J. (UKAEA Culham Lab., Abingdon). Sep 1985. 27p. H.M. Stationery Office, London price Pound 4.00.

A model for transient heat and mass transfer in internally heated debris beds is described. The model is based on conservation laws for mass and energy with phenomenological laws for flow through a porous medium. A numerical scheme based on an enthalpy method has been developed: the scheme for one dimensional beds has been implemented in the code ENTH. Two example calculations are presented. Some model limitations and possible enhancements of ENTH are discussed.

47658 (CONF-860102—Summs., pp NS-1.1) Preliminary assessment of the accident probabilities of a NERVA derivative reactor for space power applications. Simonelli, R.B.; Peoples, J.A.; Chi, J.W.H. (Westinghouse Electric Corp., Madison, PA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Gas cooled, solid core graphite reactors based on the Nuclear Engine Rocket Vehicle Application (NERVA) technology are attractive space nuclear power sources for SDI multimegawatt applications. A reactor of this type is called a NERVA Derivative Reactor (NDR). A simplified accident probability analysis of a NDR reactor for space power mission was carried out. The objective of the analysis was to identify the worst case accident and critical reactor design areas where the incorporation of appropriate design features may reduce the risks involved.

47659 (CONF-860102—Summs., pp NS-2.1-NS-2.3) Launch pad safety and the space reactor disassembly accident. Hipp, J.R.; McDaniel, P.J.; Roderick, N. (Kirkland Air Force Base, NM). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The safety of space nuclear reactors is primarily determined by those periods of time when they will exist in close proximity to human populations. One of the potentially high rise, scenarios postulated is an accident occurring on the launch pad that results in the reactor being immersed in a hydrogen rich fluid. For fast spectrum cores that are currently under consideration, this could produce a super-critical excursion. As a result, design penalties are being accepted in order to ensure that the reactor will never go critical under such circumstances. These design penalties may be quite severe, if not in weight then, in their effects on the reliability of the system to perform its assigned mission once it has been launched. The purpose of this work was to investigate the potential effects of a launch pad super-criticality in terms of its explosive and radiological consequences.

47660 (CONF-860102—Summs., pp NS-4.1-NS-4.2) Inherent safety of the thermionic space reactor. Stamatelatos, M.G.; Barsell, A.W.; Fisher, C.R. (GA Technologies Inc., San Diego, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The in-core thermionic space reactor (SP-100) safety requirements were largely based on OSNP-1, the Nuclear Safety Criteria and Specifications for Space Nuclear Reactors, with complementary requirements from the SP-100 Project Office. The three general categories of the OSNP-1 requirements are: (1) safety design features, (2) subcriticality under credible accident conditions and (3) radiation protection criteria for normal and off-normal conditions throughout the mission. The mission phases of primary concern are pre-launch, launch, ascent, operations and end-of-life disposition. The safety aspects connected with reentry during both pre- and post-operation phases are addressed in a companion paper. The main issues addressed here are criticality accidents, launch-abort ac-

cidents, operational accidents and health hazards related to these accidents.

47661 (CONF-860102—Summs., pp NS-5.1-NS-5.3) **Reentry safety of the thermionic space reactor.** Barsell, A.W.; Hwa, V.; Stamatelatos, M.G. (GA Technologies, San Diego, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The planned (end-of-life) or unplanned (accidental) reentry of a space nuclear reactor poses the threat of dispersal under thermal and mechanical loads with the potential result of land and water contamination and of population exposure to radioactive and non-radiative toxic materials. The safety consequences of reentry can be minimized if either the reactor enters essentially intact, i.e., all radioactive and toxic materials are in one piece, or it atmospheric dispersal is so fine that no significant health hazards result from population exposure. The main sources of radioactive materials in the thermionic space power (SP-100) reactor are the fuel (fission products and transuranics) and the neutron activation products, especially the long-lived Nb-94 isotope. The thermionic SP-100 systems contains temperature-resistance refractory materials which are not expected to naturally ablate and disperse under the reentry heat loads. Therefore, the reactor has been designed to reenter essentially intact in the earth's atmosphere after operation in orbit or after ascent or boost abort.

47662 (CONF-860102—Summs., pp NS-6.1-NS-6.4) **Study of nuclear reactor disposal/replacement concepts for the growth space station.** Heller, J.A. (NASA-Lewis Research Center, Cleveland, OH). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Presentation is made of the results of an in-house study to investigate a wide number of alternatively safe and reliable disposal concepts for the spent reactor system of a 300-kWe nuclear powered Growth Space Station. Since the nominal 500-km Space Station orbit is below the nuclear safe orbit, a safe disposal/replacement method should be identified early in the SP-100 program so that its features may be more readily incorporated into the final design.

47663 (CONF-860102—Summs., pp NS-7.1-NS-7.5) **Decay heat thermal management of SP-100 systems.** El-Genk, M.S.; Buksa, J.J.; Seo, J.T. (Univ. of New Mexico, Albuquerque). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

A concern in the operation of nuclear powered space systems is to avoid freezing the liquid metal coolant following a routine or an accidental shutdown of the nuclear reactor. The decay heat as well as the time to reach the coolant freezing temperature depends on the ambient temperature in orbit as well as the operating power and time before shutdown. This paper presents the results of a study of the decay heat removal from an SP-100 thermoelectric system following seven years of continuous operation at a nominal thermal power of 2000 kW. The coolant temperature in the primary loop was calculated as a function of time after reactor shutdown for ambient temperatures of 250 and 500 K. The effect on the coolant temperature and/or time to freeze of disconnecting the electric load was also investigated.

47664 (CONF-860102—Summs., pp NS-8.1-NS-8.2) **Liquid metal reactor (LMR) design for operational reliability and safety.** Temme, M.I.; Bailey, H.S.; Garate, J.A. (General Electric Co., Sunnyvale, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The design of a nuclear reactor power source for space application demands the close integration of operational reliability and safety in the design process. The assurance of reliability for missions of 7-10 year duration, either little opportunity for maintenance and repair, translates into relatively low limits on failure rates for the components. The process by which operational reliability and safety requirements are translated into design features and concept selections for the liquid metal reactor (LMR) SP-100 is described. The safety system reliability requirement is 99% over the mission lifetime, and the reactor system operational reliability requirement is approximately the same. The allocation of these requirements to component level is presented. Component and design features selected to meet these allocations are described.

47665 (CONF-860204—39) **Instrument accuracy in reactor vessel inventory tracking systems.** Anderson, J.L.; Anderson, R.L.; Morelock, T.C.; Hauang, T.L.; Phillips, L.E. (Oak Ridge National Lab., TN (USA). Instrumentation and Controls Div.; Nuclear Regulatory Commission, Washington, DC (USA)). 1986. Contract AC05-84OR21400. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008993.

From Thermal reactor safety meeting; San Diego, CA, USA (2 Feb 1986).

Instrumentation needs for detection of inadequate core cooling. Studies of the Three Mile Island accident identified the need for additional instrumentation to detect inadequate core cooling (ICC) in nuclear power plants. Industry studies by plant owners and reactor vendors supported the conclusion that improvements were needed to help operators diagnose the approach to or existence of ICC as well as to provide more complete information for operator control of safety injection flow to minimize the consequences of such an accident. In 1980, the US Nuclear Regulatory Commission (NRC) required further studies by the industry and described ICC instrumentation design requirements that included human factors and environmental considerations. On December 10, 1982, NRC issued to Babcock and Wilcox (B and W) licensees orders for Modification of License and transmitted to pressurized water reactor licensees Generic Letter 82-28 to inform them of the revised NRC requirements. The instrumentation requirements include upgraded subcooling margin monitors (SMM), upgraded core exit thermocouples (CET), and installation of a reactor coolant inventory tracking system. NRC Regulatory Guide 1.97, which covers accident monitoring instrumentation, was revised (Rev. 3) to be consistent with the requirements of item II.F.2 of NUREG-0737.

47666 (CONF-860501—15) **Progress and future plans in the PFR/TREAT safety testing programs.** Alter, H.; Cowking, C.B.; Klickman, A.E.; Wood, M.H. (Argonne National Lab., IL (USA); UKAEA Risley Nuclear Power Development Establishment; UKAEA Atomic Energy Establishment, Winfrith). 1986. Contract W-31-109-ENG-38. 11p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014494.

From Conference on the science and technology of fast reactor safety; Channel Islands, UK (12 May 1986).

This paper briefly describes the progress to date on the joint UKAEA/USDOE program of fast reactor fuel safety testing and the definition of the future tests. The program involves transient tests in the TREAT reactor on fresh and irradiated mixed fuel pins. The tests simulate transient overpower (TOP) accidents, which result from an unintentional addition of reactivity and transient undercooling followed by overpower (TUCOP) accidents, which arise from an unintentional stoppage of the primary sodium circulating pumps, both with failure to scram. Thirteen tests have been performed to date, all on UK pins. Future plans include five tests, all on US pins which have been irradiated in FFTF. Much has been learned about the behavior of fuel driven to conditions well beyond those existing during normal reactor operation.

47667 (CONF-860610—2) **Top-down versus bottom-up processing of influence diagrams in probabilistic analysis.** Timmerman, R.D.; Burns, T.J.; Dodds, H.L. Jr. (Oak Ridge National Lab., TN (USA); Tennessee Univ., Knoxville (USA)). 1986. Contract AC05-84OR21400. 7p. NTIS, PC A02/MF A01 - GPO. File Number TI86005151.

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

Recent work by Phillips and Selby has shown that influence diagram methodology can be a useful analytical tool in reactor safety studies. In some instances an influence diagram can be used

as a graphical representation of probabilistic dependence within a system or event sequence. Under these circumstances, Bayesian statistics is employed to transform the relationships depicted in the influence diagram into the correct expression for a desired marginal probability (e.g. the top node). Top-down and bottom-up algorithms have emerged as the dominant methods for quantifying influence diagrams. The purpose of this paper is to demonstrate a potential error in employing the bottom-up algorithm when dealing with interdependencies.

47668 (CONF-860932—1) **Relocation tabletop exercise: federal radiological response in the post-accident phase.** Grant, K.; Adler, M.V.; Wolff, W.F. (Oak Ridge National Lab., TN (USA); USDOE Assistant Secretary for Environment, Safety and Health, Washington, DC. Office of Nuclear Safety). 1986. Contract AC05-84OR21400. 5p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008499.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The federal Radiological Emergency Response Plan (FRERP) was developed to provide the framework for coordinating federal radiological assistance to states and to local authorities faced with a large radiological accident. The Relocation Tabletop Exercise was conducted on December 9-11, 1985 at the Beaver Valley Power Station, the site of the simulated accident. The exercise scenario had postulated a substantial release of radioactive materials from a fuel handling accident at the Beaver Valley Power Station in Shippingport, Pennsylvania, leaving radioactive materials deposited over part of the surrounding area. The exercise was structured as a sequential series of nice mini-scenarios, each of which focused on one problems. The exercise was intended to identify issues and problems which needed consideration or procedures which might need to be developed for this post-accident phase. It was a "no-fault" excercise.

47669 (DOE/NE/37945—1) **Simulation-based expert system for nuclear reactor control and diagnostics. Progress report.** Lee, J.C.; Martin, W.R. (Michigan Univ., Ann Arbor (USA). Dept. of Nuclear Engineering). 31 Jul 1986. Contract AC02-85NE37945. 18p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014668.

This research concerns the development of artificial intelligence (AI) techniques suitable for application to the diagnostics and control of nuclear power plant systems. The overall objective of the current effort is to build a prototype simulation-based expert system for diagnosing accidents in nuclear reactors. The system is being designed to analyze plant data heuristically using fuzzy logic to form a set of hypotheses about a particular transient. Hypothesis testing, fault magnitude estimation and transient analysis is performed using simulation programs to model plant behavior. An adaptive learning technique has been developed for achieving accurate simulations of plant dynamics using low-order physical models of plant components. The results of the diagnostics and simulation analysis of the plant transient are to be analyzed by an expert system for final diagnoses and control guidance. To date, significant progress has been made toward achieving the primary goals of this project. Based on a critical safety functions approach, an overall design for the nuclear plant expert system has been developed. The methodology for performing diagnostic reasoning on plant signals has been developed and the algorithms implemented and tested. A methodology for utilizing the information contained in the physical models of plant components has also been developed. This work included the derivation of a unique Kalman filtering algorithm for using power plant data to systematically improve on-line simulations through the judicious adjustment of key model parameters. A few simulation models of key plant components have been developed and implemented to demonstrate the method on a realistic accident scenario. The chosen transient is a loss of feed flow exasperated by a stuck open relief valve, similar to the initiating event of the Three Mile Island Unit 2 accident in 1979.

47670 (EPRI-NP—4455, pp 1.1-1.12) **Research related to severe reactor accidents.** Kerr, W. (Univ. of Michigan, Ann Arbor). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

One might describe the objectives of severe accident research as obtaining information needed to make decisions on the appropriate way to deal with the risk of severe accidents. Establishing an appropriate policy for dealing with severe accidents is manifestly difficult, and requires consideration of questions both political and scientific. Emphasis on severe LWR accident research was accelerated immediately following the TMI2 accident. Since that time a significant body of information has been collected. What is needed at this time is a synthesis of the existing information into a coherent policy. Such a synthesis will point to and help establish priorities for additional research that may be needed. Comments are made on some areas that appear to merit further exploration, and on possible approaches to a coherent policy.

47671 (EPRI-NP—4455, pp 3.1-3.16) **Flooding in particle beds and its role in dryout heat flux prediction.** Schrock, V.E.; Wang, C.H.; Revankar, S.; Wei, L.H.; Lee, S.Y.; Squarer, D. (Univ. of California). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

In recent years a large amount of research has been conducted to develop the ability to analyze the evolution of severe core damage in postulated LWR accidents. The ability to remove decay power from a bed of debris particles following severe core damage has been the subject of many theoretical and experimental studies and a number of models have been proposed for the dryout heat flux. The flooding process, i.e., the hydrodynamic limit on the necessary counter current flow, has been suggested as one of the controlling mechanisms for beds cooled by liquid supplied only above the bed. An experimental investigation has been conducted on flooding of steam and water in isothermal homogeneous beds of particles with an overlying two-phase pool. The beds were spherical particles of 8, 16 and 39 mm diameter and cylinders 16 mm in diameter and length in cylindrical test sections 15 and 30 cm in diameter. Water was injected into the overlying pool at saturation temperature or with 50°C of subcooling. A new correlation was obtained which provides improved prediction of dryout heat flux for internally heated beds. A theoretical prediction of flooding, based upon relative permeabilities for two-phase flow proposed by Lipinski, was found to agree rather well with the new correlation. A limited study of multi-dimensional effects was included in the experimental program.

47672 (EPRI-NP—4455, pp 4.1-4.9) **Refined model for the coolability of core debris with flow entry from the bottom.** Schulenberg, T.; Mueller, U. (Dornier System GmbH, Friedrichshafen, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Within the context of a hypothetical severe accident in light water reactors also heat generating debris beds of a coarse particle size are discussed. A refined model for two-phase flow in particle beds is presented. Compared to previous models this model takes into account the effect of interfacial drag forces between liquid and vapor. These effects are important in coarse debris beds. The model is based on the momentum equations for separated flow, which are closed by empirical relations for the wall shear stress and the interfacial drag. When the refined model is applied to LWR severe accident scenarios an increased dryout heat flux is predicted for debris beds with flow entry from the bottom driven by a moderate downcomer head.

47673 (EPRI-NP—4455, pp 5.1-5.20) **Two-phase flow in stratified porous media.** Lee, H.S.; Catton, I. (Univ. of California, Los Angeles). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Light-water reactor accident sequences postulate the formation of particulate beds of core debris materials. In assessing this potential problem, pressure drop and void-fraction for liquid-gas concurrent upward flow in porous media are correlated from the experiments performed in one-dimensional packed beds of glass spheres. A nonhomogeneous two-dimensional structure of porous material is then considered. Analysis is done for the multi-dimensional porous media by following the classical approach of continuum-relative permeability model. Solutions are obtained by a finite-difference numerical scheme. The calculated pressure and void-fraction profiles are in good agreement with the experimental measurements.

47674 (EPRI-NP—4455, pp 6.1-6.13) **Transient analysis of debris bed heat transfer.** Brealey, N.J.; Moore, K.A.; Turland, B.D. (UKAEA, Abingdon, England). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

One-dimensional models of steady-state heat transfer from a bed of self-heated particulate debris by a boiling coolant have been developed which are based on the concepts of two-phase flow through a porous medium. These models provide reasonable predictions of the dryout heat flux for a wide variety of particulates and coolants; they also provide explanations of the deleterious effects of bed stratification and the existence of stable dry-zones found in some experiments. However, both experiments that go beyond dryout and applications to accident sequences in which the debris proves uncoolable, require either transient (rather than steady-state) modelling or a justification that steady-state results can be used in a quasi-transient manner. Further, the time to dryout and the location of the first dried-out region are parameters that can be measured in experiments, and provide validation (or otherwise) of the model, if sufficient transient terms have been retained. This paper presents generalizations of the transient model first discussed by Turland and Moore. Because of the different mathematical forms of the equations, which lead to the choice of differing analytic and/or numerical techniques the authors retain the distinction of Turland & Moore between models with and without capillary pressure. To take full advantage of the transient modelling it is necessary to be able to extend calculations beyond dryout. This is discussed in the paper where results using an enthalpy formulation are presented.

47675 (EPRI-NP—4455, pp 7.1-7.8) **Scale effects and structure of dryout zone in debris bed coolability experiments.** Hu, K.; Theofanous, T.G. (Purdue Univ., West Lafayette, IN). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

This paper presents the second and third rounds of experimental data from Purdue's Large Scale Debris Bed Coolability Simulation Facility. This facility employs a novel experimental technique for creating a volumetrically (or quasi-volumetrically) heated bed of arbitrary dimensions. These dimensions are only limited by available DC or AC power. In the current setup a variable 100 kw DC power generator is employed for a cylindrical bed 101.6 cm in height and 21.6 cm in diameter. The present bed was assembled by layering the coiled, and threaded by 1.27 cm aluminum balls, resistance heaters with 8 mm nominal dimensions stone gravel. A total of 240 thermocouples are placed throughout the bed and are scanned at 5 s intervals using PDP-11 computer and associated multiplexing equipment. This experimental effort is motivated by the total lack of coolability limit data in the very deep beds of large ($d > 3$ mm), irregularly shaped particles of interest in LWR severe accidents analyses.

47676 (EPRI-NP—4455, pp 8.1-8.10) **Experimental studies of dryout during boiling in particle beds at AEE Winfrith (UKAEA).** Stevens, G.F. (Winfrith Atomic Energy Establishment, Dorchester, England). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

This paper outline recent experimental work on particle bed dryout at AEE Winfrith. Progress has been made in developing dielectric heating for particle beds. This heating method is a good simulant for decay-heating when the particles are irregular, as in the case of reactor core disruption accidents in LWRs. The electrical resistance heating method has been used to study the effects on dryout heat flux of increasing the operating pressure from 1 bar to 9 bar. An examination of the relationship between flooding and dryout in beds of large particles has been made.

47677 (EPRI-NP—4455, pp 9.1-9.23) **Dryout of a multi-dimensional porous bed.** Tsai, F.P.; Catton, I. (Univ. of California, Los Angeles). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Coolability of a heterogeneous debris bed resulting from a hypothetical severe LWR or LMFBR accident was studied both experimentally and analytically. The debris bed was modeled with stainless steel spheres of diameters 1.6, 3.2, and 4.8 mm. Freon-113 and methanol were used as coolants. The dryout heat flux in the bed of heated steel spheres was found to be much higher than a similar homogeneous bed. The amount of increase was found to depend strongly on the geometry of the bed.

47678 (EPRI-NP—4455, pp 10.1-10.9) **Coolability of UO_2 debris beds in pressurized water pools: DCC-1 and DCC-2 experiment results.** Reed, A.W.; Bergeron, E.D.; Boldt, K.R.; Schmidt, T.R. (Sandia National Lab., Albuquerque, NM). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—). Contract AC04-76DP00789.

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

DCC-1 and DDC-2 are first two experiments in the US Nuclear Regulatory Commission's (USNRC) Degraded Core Coolability (DCC) Program being performed at Sandia National Laboratories. The DDC program is part of the NRC's Severe Fuel Damage (SFD) program established after the accident at the Three Mile Island-2 reactor. The main objective of the DCC program is to verify, with a limited number of in-pile experiments, the accuracy of existing debris coolability models in previously untested SFD parameter regimes. The primary test matrix consists of three experiments, the first two of which are reported here. Both of these tested the coolability of a deep UO_2 debris bed in a pressurized water bath, with pressure varying from 1 to 170 atmospheres. The beds were fission-heated in the Annular Core Research Reactor to simulate the internal heat generation from decay heat in an SFD accident. DCC-3, to be performed in mid-1985, will be a similar experiment with the addition of bed stratification and liquid injection at the bottom of the bed.

47679 (EPRI-NP—4455, pp 11.1-11.10) **Geometrical radiation exchange factors for axial radiative transfer in an LWR core filled with absorbing-emitting gases.** Chan, S.H.; Cho, D.H. (Univ. of Wisconsin, Milwaukee). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The recent Three Mile Island accident has generated much interest in the thermal-hydraulic analysis of a light water reactor core that is uncovered and heated beyond the current design basis limit (2200°F). One of the major interests concerns the cooling capability of the uncovered rod bundles. In addition to convection by the gas mixture which comprises water vapor, hydrogen gas and fission products etc., thermal radiative transfer would have to be considered as it becomes increasingly important when the bundles get hotter. The evaluation of radiative cooling of the bundles, however, is complicated by several factors. Other than the complex physical geometry, the bundles are highly nonisothermal radially and axially. Thus radiative heat exchange should be considered, not only in radial direction but in axial direction as well. A reactor core filled with an emitting-absorbing mixture is considered. Analysis is provided to evaluate axial radiative heat exchange of a rod bundle

with a nonuniform axial temperature distribution. The necessary radiation exchange shape factors between segments of the complex rod bundle arrangement are presented. They are applicable to arbitrary sizes of segments, well suited for numerical computations.

47680 (EPRI-NP—4455, pp 12.1-12.15) **Quenching by top flooding of a heat generating particulate bed with gas injection at the bottom.** Tung, V.X.; Dhir, V.K.; Squarer, D. (Univ. of California, Los Angeles). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Continued undercooling of the core of a light water reactor can result in severe degradation of the core material. In the degraded state, the core can form a heat generating debris bed. Successful quenching of such a debris bed must be accomplished before continuous cooling can be established. In this paper, experimental results on top quenching of a particulate bed with internal heat generation are reported. The effect of gas injection at the bottom was also examined. A model which included the effect of axial conduction is proposed to predict the quench front history and temperature variation in the unquenched portion of the bed.

47681 (EPRI-NP—4455, pp 13.1-13.15) **Transient quenching of superheated debris beds during bottom reflood.** Tutu, N.K.; Ginsberg, T.; Klein, J.; Schwarz, C.E.; Klages, J. (Brookhaven National Lab., Upton, NY). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Light water reactor degraded core accident sequence studies postulated the existence of superheated core debris beds within the reactor vessel. Indeed, results of the examination of the Three-Mile Island Unit 2 reactor suggest that a portion of the reactor core was fragmented into a solid debris bed. Thus from both the accident management viewpoint and the accident evaluation viewpoint, it is necessary to understand the quench characteristics of such a degraded core. Depending upon whether or not the bottom of the debris bed is completely blocked, the bed would either be cooled by an overlying pool of water or by the forced injection of the coolant from below. The physical and thermal state of the degraded core is most likely to be three-dimensional in nature. As a first step, however, in understanding this complex thermal-hydraulic behavior, the present work is concerned with studying the transient quenching of a physically homogeneous bed when the coolant is injected from below at a constant flow rate. Experimental and analytical modeling studies are discussed.

47682 (EPRI-NP—4455, pp 14.1-14.13) **Fluidization of a particulate bed during quenching by flooding from bottom.** Tung, V.X.; Dhir, V.K. (Univ. of California, Los Angeles). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Severe undercooling of a light water reactor (LWR) core can result in overheating of the fuel elements accompanied with an eventual loss of structural integrity. Under such a degraded state, the core debris may collect in the coolant channels in the form of a heat generating porous blockage. Before continued cooling of this heated porous layer can be established, complete quenching has to be accomplished. Experimental data have been obtained on quench front history and the magnitude of the pressure pulse which resulted in fluidization of the particulate bed during quenching by bottom flooding. A semi-theoretical model has been proposed to predict the magnitude of the initial pressure pulse. The model is found to compare reasonably well with the experimental observation.

47683 (EPRI-NP—4455, pp 15.1-15.10) **New interpretation on formation of UO_2 Post-Accident Heat Removal particulate in sodium.** Schins, H. (Joint Research Centre, Ispra, Italy). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

A comparative experimental study on quenching in sodium of four molten fuel materials, $UO_2Al_2P_3$, Cu and stainless steel, is presented. Experimental results like temperatures, pressures, particle shapes, particle size distributions, crack patterns and crystal grain sizes are given and interpreted. These fuel-coolant interactions (FCI) can be understood as all being characterized by transition boiling of sodium. The fuel is first fragmented by the sodium vapor bubble growth and collapse process. These particulates have smooth surfaces. The two materials, UO_2 and Al_2O_3, are fragmented further by a delayed mechanism which is thermal stress shrinkage cracking. Delayed particles are fragments of larger ones. Furthermore, attention is drawn to the theoretical results which show that pure FCI-particulate is significantly finer.

47684 (EPRI-NP—4455, pp 16.1-16.11) **Boil, a two dimensional model for boiling in an active particles bed.** Theunissen, P.H.; Bushlin, J.M.; Joly, C. (von Karman Institute for Fluid Dynamics, Genese, Belgium). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The present paper deals with the modelization of the 2D boiling in an active particles bed. A 2D steady state and isothermal model is assembled starting from the mass, momentum and energy conservation laws. The momentum balance includes capillary and gravity effects as well as two phase flow pressure losses. This physical description is implemented as a numerical code, named BOIL. One and two dimensional test cases are run to emphasize the effects of boundary conditions, heat source distribution, and relative permeabilities laws. Further developments are proposed for the BOIL implementation into a broader computer code (such as TORPEDO).

47685 (EPRI-NP—4455, pp 17.1-17.11) **Extended dryout and rewetting of small-particle core debris.** Barleon, L.; Thomauske, K.; Werle, H. (Kernforschungszentrum Karlsruhe, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

In the analysis of degraded core LWR accidents, the behavior of core debris has to be considered. This debris could be formed within the reactor vessel or in the reactor cavity, depending on the preceding accident history. There is generally an agreement, that the dryout limit is the most important parameter and correspondingly most work has been devoted to this topic. But the behavior after dryout (size and temperature distribution of dry zone) is also of interest because, if remelting of the fuel occurs, attack on and failure of the supporting structure is possible. On the other side, dry debris may be quenched by feeding in emergency cooling water. Steam generated during rewetting may cause pressure loadings on the primary system or on the containment and therefore the rewetting behavior is also important. In this work, the beds were composed of small, spherical stainless steel particles and water was used as coolant. Small particles are characterized by capillary pressure being comparable to the hydrostatic pressure. Extended dryout, especially the location, size and temperature distribution of the dry zone and the variation of these parameters with time and power density (down to rewetting) was studied with volume-heated beds. In addition, transient rewetting was investigated starting with a dry bed of uniform temperature.

47686 (EPRI-NP—4455, pp 18.1-18.9) **Coolability of UO_2 with downward heat removal the D10 experiment.** Mitchell, G.W.; Ottinger, C.A.; Meister, H. (Sandia National Labs., Albuquerque, NM). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—). Contract AC04-76DP00789.

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The Debris Coolability Program at Sandia National Laboratories (SNL) began in 1975 to investigate the coolability of particle

beds which may form following a severe accident involving core disassembly in a nuclear reactor. The Debris Bed Experiments which comprise the program are conducted in the SNL Annular Core Research Reactor by fission heating fully enriched urania which is submerged in a sodium pool. The experiments provide data which form the basis for the development of detailed phenomenological provide data which form the basis for the development of detailed phenomenological models. D10 is the first in the series to study the effects of bottom cooling which might be provided by structural materials onto which the reactor debris might settle in an accident condition. Additionally, it was designed to achieve temperatures in the debris approaching the melting point of UO_2 to investigate any change in coolability which might occur at those temperatures. These objectives were successfully met during the experiment, which was operated for a period of over 53 hours. Downward cooling was investigated under subcooled, packed bed and channeled bed conditions. Packed bed and channeled bed dryout powers were determined under several downward cooling conditions. Extended dryouts were established with maximum temperatures in the bed of 2500°C.

47687 (EPRI-NP—4455, pp 19.1-19.10) **Design features to enhance debris bed coolability.** Gabor, J.D.; Cassulo, J.C.; Pedersen, D.R. (Argonne National Lab., IL). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The use of appropriately designed (sculptured) layers of porous blocks fabricated from sintered shot that contain the debris bed and act as a device to enhance debris bed dryout has been experimentally and theoretically investigated. Experiments were conducted with a two-dimensional bed (11.1 mm thick by 305 mm wide by 150 mm high) cf inductively heated 105 to 1000-μm stainless steel and nickel particles in water. Vertical columns of 3-mm glass balls within the metal particle bed enhanced the dryout heat flux. Dryout data for up to five 12.7, 25.4, 38.1, and 50.8-mm wide columns of the glass balls were compared with various modeling concepts. The dryout heat flux, in general, increased with column width and the number of columns. The Bubble Flow Model applied to parallel vapor flow within the glass-ball columns and debris bed gave the best agreement of the different models with the data.

47688 (EPRI-NP—4455, pp 20.1-20.9) **Penetration of a heated pool into a melting miscible substrate.** Eck, G.; Werle, H. (Kernforschungszentrum Karlsruhe, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Core-catchers have been proposed, which, after a core disruptive accident in a nuclear reactor, prevent containment failure caused by contact of the molten debris with the underlying ex-vessel structural materials. Most of these core-catchers are provided with sacrificial layers which on melting consume some fraction of the decay heat and dilute the heat sources and the fissionable material as the core masses are dissolved by the molten sacrificial material. Dilution of the core masses results in relatively low heat fluxes and temperatures at the wall of the core-catcher and, in addition, reduces the probability of recriticality. An experimental study was conducted on melting systems consisting of a liquid over-lying a solid substrate, which after melting of the solid, are mutually miscible. To initiate melting, the liquid was heated either by a planar heater from above or internally by an ac current. The density of the liquid was varied systematically, and it was found that downward heat transfer increases strongly with this parameter. In addition to heat transfer, mass transfer was studied by measuring the local concentration of the molten material in the liquid. A few experiments were performed in which sideward melting and two-dimensional pool growth were investigated.

47689 (EPRI-NP—4455, pp 21.1-21.10) **Modeling of core debris-sodium-concrete interactions.** Cheung, F.B.; Pedersen, D.R.; Nguyen, D.H. (Argonne National Lab., IL). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The interactions between sodium and concrete in the presence of heat-generating core debris resulting from a postulated core meltdown accident in a sodium-cooled fast reactor are complex yet important phenomena relevant to several key safety issues. In particular, the attack of sodium and of core debris on the concrete basemat below the reactor cavity, the generation of hydrogen gas, and the pressurization of the reactor building as a result of the interactions represent, among others, the major sources that provide a challenge to containment integrity. Thus far, no physical model has been developed to describe the nature and the extent of sodium-concrete interactions with core debris present. Most of the previous studies have been confined to either the case of core debris-concrete interactions without sodium or the case of sodium-concrete interactions without fuel. In the former case, the initial conditions are so defined that the chemical erosion phase is completely ignored. In the latter case, on the other hand, the long-term melt penetration process is not considered. The termination of the sodium-concrete reactions simply marks the end of the event. It is the purpose of this study to provide a complete physical description of the scenario involved in the core debris-sodium-concrete interactions, starting from the chemical erosion phase through the molten pool formation phase to the long-term melt penetration phase.

47690 (EPRI-NP—4455, pp 22.1-22.15) **Effects of the presence of core debris on the behavior of sodium-concrete reactions.** Nguyen, D.H.; Muhlestein, L.D. (Westinghouse Hanford Co., Richland, WA). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

In the event of a LMFBR reactor vessel melt-through, the core debris will likely be deposited at the bottom of the sodium pool, overlying the concrete surface of the reactor cavity. The mixture of products from sodium-limestone concrete reactions is in a liquid state at about 600°C. The core debris would sink into the reaction product layer, thereby providing an internal heat source, in addition to heat from chemical reactions. A situation of sodium-concrete reactions without core debris present could arise when a coolant pipe break takes place outside the reactor vessel. This paper compares the behavior of sodium-concrete reactions with and without core debris present inside the reaction product layer. The effects of variable decay heat intensity are also assessed.

47691 (EPRI-NP—4455, pp 23.1-23.14) **Thermal-hydraulic uncertainties affecting severe accident progression.** Haskin, F.E.; Behr, V.L. (Sandia National Lab., Albuquerque, NM). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

In this paper, the authors focus on thermal-hydraulic uncertainties associated with severe PWR accidents. It is hoped that the discussion will help identify analyses and experiments which could reduce the uncertainties. The topics covered include: PWR depressurization, extent of in-vessel hydrogen production, in-vessel steam explosions, mode of fuel discharge, steam spike, coincident steam spike and hydrogen burn, direct heating, debris coolability, core-concrete interactions, ignition and combustion, equipment survival, and risk perspective and conclusions.

47692 (EPRI-NP—4455, pp 24.1-24.10) **Natural circulation phenomena and primary system failure in station blackout accidents.** Nourbakhsh, H.P.; Lee, C.H.; Theofanous, T.G. (Purdue Univ., West Lafayette, IN). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The potency of high pressure steam natural circulation phenomena to redistribute decay heat within the primary system components during the LWR core post-dryout/premelt period has not be fully appreciated in the past. A simplified analysis is summarized first as a way of developing a feel for the order of magnitude of

various effects. Some simple experiments of natural circulation within a partially volumetrically heated porous medium are presented to more concretely demonstrate the efficacy of natural circulation cells to penetrate deeply into a heated porous bed. This paper then concludes with a brief description of a numerical model including applications to this demonstration experiment as well as the reactor conditions of interest. High pressure steam natural circulation phenomena can be responsible for redistributing the core decay power to all primary systems components that are accessible to form circulating loops with the core region. As a result the primary system boundary is expected to fail prior to core melting, and the so-called high pressure scenario would appear unlikely. The possible role of clad ballooning, and oxidation remains to be assessed before these conclusions can be applied to all possible variations of a Station Blackout (or other similar) accident.

47693 (EPRI-NP—4455, pp 25.1-25.10) **Depressurization of the primary circuit during a PWR-high-pressure meltdown accident.** Eyink, J.; Hassmann, K. (Aktiengesellschaft, Erlangen, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Accident scenarios leading to PWR core-meltdown under high pressure have been investigated. In a transient case, RPV-failure will occur after about five hours. Because of the immediate failure of the surrounding concrete structure the pressure peak within the reactor cavity is limited and will thus not endanger the RPV-support. Therefore, even a rapid depressurization will have no effect on the integrity of the containment. The long-term course of the accident is quite similar to LOCA-initiated core-meltdown scenarios loading to overpressurization of the containment after about 5 days. During the first time following RPV-failure, the distribution of hydrogen, air and steam is not homogeneous. Therefore the thermodynamic states differ from those achieved from one volume calculation.

47694 (EPRI-NP—4455, pp 26.1-26.14) **Impact of heat-generating debris on containment loading - an overview.** Squarer, D. (Electric Power Research Institute, Palo Alto, CA). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The contribution to containment loading by five sources was identified. These sources are: containment initial conditions when the primary system is breached, hydrogen combustion, direct containment heating, steam spike, steam explosion, and debris/concrete interaction. When a conservative evaluation indicates that a containment is not threatened by these sources no refinement of the calculation is needed. However, for those containments that are threatened, a best estimate evaluation is needed. A list of recommended additional research is suggested in order to be able to perform best estimate calculations. Most of the suggested items are unrelated to the category of debris coolability since this category is understood at present much better than any of the other suggested research topics.

47695 (EPRI-NP—4455, pp 27.1-27.3) **Analysis of severe accident phenomena using EXMEL, EXMEL-B and MELSIM.** Bisanz, R.; Schmidt, F.; Unger, H. (Institute fuer Kernenergetik und Energiesysteme, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Within the frame of international research on reactor safety issues various experimental and theoretical programs were initiated in order to investigate the behavior of fuel rods, bundle and core in uncovery transients. Accident scenarios are considered which lead to fuel damage. Theoretical contributions to research objectives require complex modeling and have to based on complex computer and software techniques. The modular program systems EXMEL (fuel rod analysis), EXMEL-B (bundle analysis) and MELSIM 3 (core analysis) are the result of approaches to such problems. The code systems have been applied to severe fuel damage experiments in the Power Burst Facility and the Projekt Nukleare Sicherheit (PNS) of the Kernforschungszentrum Karlsruhe, the core damage calculations for the TMI incident and in the frame of the German Risk Study, Phase B. The paper presents comparison results of the severe fuel damage experiments and calculations as well as results of the analysis of a high pressure core meltdown scenario.

47696 (EPRI-NP—4455, pp 28.1-28.12) **Progression of a PWR severe accident from core melt to cavity interactions.** Turland, B.D.; Morgan, J. (UKAEA, Abingdon, England). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

The progression of a PWR severe accident sequence after vessel failure, and the loads that are then placed on the containment is dependent, at least in its details on the in-vessel part of the accident sequence. This will determine the mode and timing and vessel failure, the quantities of material that are subsequently released to the containment building and the location of debris (which influences its coolability). Currently mechanistically based models exist for the core heating phase and the early stages of core degradation, but there is a need for more mechanistic descriptions of the latter part of the in-vessel sequence than is available in published codes. In this paper the authors discuss the phenomenology of the accident sequence from the release of material from the core region to the onset of cavity interactions; the reactor under consideration is assumed to be large modern PWR of the SNUPPS type. Before debris can interact with the structures and water in the vessels lower head it must first interact with the lower fuel nozzles and the lower core plate; this is discussed in section 2. In section 3 the authors consider the question of whether vessel failure is likely to occur immediately after debris interaction with the lower core plate, or whether the debris is in the lower head for a significant time prior to vessel failure. For this latter scenario, models for heat transfer from the debris to the vessel are considered in section 4; section 5 is concerned with the failure of the vessel.

47697 (EPRI-NP—4455, pp 29.1-29.2) **Severe accident sequence analysis with respect to debris formation and coolability.** Mayr, P.; Bisanz, R.; Unger, H. (Institute fuer Kernenergetik und Energiesysteme, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

Various computer codes have been developed to analyze the course of severe accidents and the physical phenomena involving EXMEL, EXMEL-B, MELSIM and KESS. The models shall be described briefly in the paper. The modular program system KESS2 is being developed in order to allow the analysis of the course of severe accidents in light water reactors. The present paper is dealing with the debris formation and coolability question during the course of severe accidents. Starting with the initiation of the accident, the consecutive events which may result in the formation of debris beds as well as the physical phanomena involved have been derived by means of an accident sequence analysis. The analysis reflects the cause-consequence relation of the essential physical phenomena in the order of their occurrence: quenching of fuel rods in the core; fragmentation of fuel rods and core structures due to quenching; fluidization of fragments due to the onset of ECC injection; effectiveness of the transport mechanisms within the porous medium (debris or rubble beds); and occurrence of dryout.

47698 (EPRI-NP—4455, pp 30.1) **Review of IDCOR effort.** Henry, R. (Fausk & Associates, Burr Ridge, IL). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

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The IDCOR program has addressed the major processes associated with severe core damage accidents, including hydrogen generation and combustion, steam explosions, rapid steam generation, debris coolability, core-concrete attack and the release of fission products to the environment. These issues have been addressed

individually and representative models have been integrated into system analysis codes for both the BWR and PWR designs. The Modular Accident Analysis Programs (MAAP) provide an assessment of the overall primary system and containment response to postulated accident scenarios for a variety of designs. Through the use of these integrated system codes, the major physical processes determining the fission product release to the environment, and hence the implications on public health and safety, can be determined. In this paper, these individual physical processes are reviewed and integrated system analyses are presented which demonstrate the influence of variations in the physical process models as well as in the accident sequence definition.

47699 (EPRI-NP—4455, pp 31.1-31.10) **Bubble-induced mixing of two horizontal liquid layers with non-uniform gas injection at the bottom.** Cheung, F.B.; Pedersen, D.R.; Leinweber, G. (Argonne National Lab., IL). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

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During a postulated severe core meltdown accident in an LMFBR, a large amount of sodium coolant may spill into the reactor concrete cavity. A layer of liquid products may form as a result of the sodium-concrete reactions. The liquid product layer, which is highly viscous and much heavier than sodium, separates the concrete from the sodium pool. In general, the downward transport of sodium through the liquid product layer to the unreacted concrete surface, which controls the rate of chemical erosion of the concrete, depends strongly on the agitation induced by gas evolution from the heated concrete. In this study, experiments were conducted to explore the effect of non-uniform gas injection on mixing of two horizontal mutually soluble liquid layers. The liquid in the lower layer was chosen to be more viscous and heavier than the liquid in the upper layer. To simulate the reactor accident situation, gas was injected at the bottom of the liquid-liquid system through a circular hole that covered only the center portion of the bottom surface of the lower liquid layer. The bubble-induced mixing motions were observed and the rate of mixing was measured for different hole sizes and various gas flow rates. The results of this study clearly show that the rate of gas injection is not the only parameter controlling the mixing of the liquid-liquid system. The effect of non-uniform gas injection is important at high gas flow rates. Within the present experimental conditions, the reduction in the overall mixing rate can be as large as a factor of three.

47700 (EPRI-NP—4455, pp 32.1-32.18) **Interfacial heat transfer between bubble agitated immiscible liquid layers.** Lee, M.; Kazeme, M.S. (MIT, Cambridge). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

In a postulated severe light water reactor (LWR) accident, the interaction of corium with the concrete reactor cavity is an important part of the accident analysis. The immiscible metallic and oxidic phases will be separated into two layers due to the large density difference. The interfacial heat transfer between these immiscible layers is important in characterizing the corium/concrete interaction. In this paper, the data on the surface renewal mechanism for heat transfer between bubble agitated immiscible liquid layers is reviewed. A modified version of Szekely's correlation is proposed. The predictions of the new correlation compare favorably with the experimental data of water/mercury and oil/wood's metal. A simple model based on the hydrodynamic stability of a liquid jet is proposed to model the conditions for bubble induced entrainment. The proposed model can predict the published experimental observation of entrainment in an oil/water system and not in a water/mercury system. By applying the model to corium/concrete interaction, it is concluded that the bubble induced entrainment would not occur in corium/concrete interaction.

47701 (EPRI-NP—4455, pp 33.1-33.7) **CORCON-MOD1 modelling improvements.** Corradini, M.L.; Gonzales, F.G.; Vandervort, C.L. (Univ. of Wisconsin, Madison). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

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Given the unlikely occurrence of a severe accident in a light water reactor (LWR), the core may melt and slump into the reactor cavity below the reactor vessel. The interaction of the molten core with exposed concrete (a molten-core-concrete-interaction, MCCI) causes copious gas production which influences further heat transfer and concrete attack and may threaten containment integrity. In this paper the authors focus on the low-temperature phase of the MCCI where the molten pool is partially solidified, but is still capable of attacking concrete. The authors have developed some improved phenomenological models for pool freezing and molten core-coolant heat transfer and have incorporated them into the CORCON-MOD1 computer program. In the paper the authors compare the UW-CORCON/MOD1 calculations to CORCON/MOD2 and WECHSL results as well as the BETA experiments which are being conducted in Germany.

47702 (EPRI-NP—4455, pp 34.1-34.3) **Core melt - concrete interaction: status of the WECHSL code development and present results.** Reimann, M. (Kernforschungszentrum Karlsruhe, West Germany). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

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The codes being under development and describing the phenomena of LWR severe accident concrete interaction with, to some extent, different physical modelling, are WECHSL, KAVERN, and CORCON. The principles of the WECHSL code are as follows: All experimental investigations indicate a rapid seggregation of the core melt interacting with concrete. The steel and the metallic zirconium still available from the melt down process within the RPV form the underlaying metal layer. The oxide layer with a lower density consists initially of molten fuel (UO_2) and the ZrO_2 oxidized by the zirconium-steam reaction during the melt down process. Energy can be internally produced by decay heat or by exothermic reactions. Energy is lost to the concrete and to the overlying environment by a variety of mechanisms. Moreover, energy can be exchanged between the molten layers. The latest results of WECHSL calculations for core melt accident scenarios are presented with respect to the melt front propagation into the concrete basemat, the pressure built up inside the containment, and the time dependent composition of the containment atmosphere.

47703 (EPRI-NP—4455, pp 35.1-35.14) **Containment pressure response to a meltdown condition of the light water reactor.** Kao, L.; Kagumi, M.S. (MIT, Cambridge). Mar 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920205. (CONF-841174—).

From 5. information exchange meeting on debris coolability; Los Angeles, CA, USA (7 Nov 1984).

A one cell simplified containment pressure model is incorporated into the CORCON/MOD1 code in order to study the impact of different heat transfer correlations on the containment pressurization. The effect of heat absorbed in the containment concrete wall was also studied. The results show that the downward heat transfer is important in determining the concrete ablation rate, but the containment pressurization rate is not affected much for the cases studied. It is also shown that the heat conducted into the concrete wall is a very important inherent heat sink.

47704 (GKSS—86/E/14) **Experimental and theoretical study on the reaction of hot liquid sodium with concretes.** Fritzke, H.W. (GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.); Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik; GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Anlagentechnik). 1986. 145p. (In German). NTIS, PC E11; Available from NTIS as TIB/B86-08654.

For examination of the consequences of sodium leakages on concrete members, an experimental program has been carried out comprising tests in air and in nitrogen atmosphere. Besides concrete composition, which was main test parameter, sodium mass and

sodium temperature were varied. The test results have shown a significant influence of concrete composition and melt temperature on reaction behaviour. From test results a phenomenological model of sodium-concrete interaction has been deduced, which serves as a base for development of the computer code NABET, describing the interaction process theoretically. The application of the computer code confirms the ideas underlying the model development and the suitability of the code. With 47 figs., 10 tabs.

47705 **(INIS-mf—10186) Annual meeting on nuclear technology 1981. Technical meeting: External impact.** (Deutsches Atomforum e.V., Bonn (Germany, F.R.)). 1981. 129p. (In German). (CONF-810326—). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576.

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

Besides a description of external impact philosophy, specific problems are discussed with respect to component and systems design for an LWR-type reactor, nuclear engineering, piping, machinery components under external impact loads, cable support systems under dynamic stress.

47706 (INIS-mf—10186, pp 1-34) **Common practice of component and systems for LWR-type reactors against external impact.** Krutzik, N.; Lockau, J.; Schad, O. 1981. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

The trend in analytic proof against external impact is towards extremely time-consuming work with a lot of personnel involved. It would be advisable to implement, in accordance with RSK guidelines for aircraft impact, simgplified proof procedures wherever it is possible without reducing safety standards. The listed examples refer to the type of 1300 MW PWR-type reactors of Grohnde/Phillipsburg 2.

47707 (INIS-mf—10186, pp 35-46) **Presentation of the external impact philosophy.** Liemersdorf, H. (Gesellschaft fuer Reaktorsicherheit m.b.H., GRS, Koeln, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

The call for comprehensive overall protection is the most important aspect of the external impact philosophy. Accordingly, all protective measures against individual effects must complement each other so that together they cover a wide spectrum of possible individual incidents or related effects. The purpose of this requirement is clarified by the results of the German risk analysis.

47708 (INIS-mf—10186, pp 47-58) **Protective design against impact loads in nuclear civil engineering.** Stangenberg, F.; Zerna, W. (Zerna, Schnellenbach und Partner, Gemeinschaft Beratender Ingenieure G.m.b.H., Bochum, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

Safety-relevant components are designed in a way as to resist extreme dynamic impact loads, in particular those caused by aircraft crashes and aircraft wreckage as well as by pressure waves and external explosions.

47709 (INIS-mf—10186, pp 59-97) **Seismic design in nuclear civil engineering.** Schnellenbach, G. (Zerna, Schnellenbach und Partner, Gemeinschaft Beratender Ingenieure G.m.b.H., Bochum, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

Today nuclear facilities are designed in accordance with KTA 2201, seismic design of nuclear power plants. In these KTA regulations, nuclear facilities are dealt with in terms of structural, machinery and electrical components. Seismic movements are conveyed from the soil via the building to machinery and electrical systems. The building has, therefore, central significance because of its stability under load and its conveying function. The seismic design of the structure is discussed. The design of machinery and electrical equipment is comparable in terms of earthquake response determination.

47710 (INIS-mf—10186, pp 98-119) **Mechanical behaviour of piping and machinery components under external impact loadings.** Thies, J.; Muncaciu, D. (Motor-Columbus Ingenieurunternehmung A.G., Baden, Switzerland). 1981. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

Problems relating to the design of piping and machinery components; practical aspects of such design (interaction between structural parts and/or between structural parts and fluids).

47711 (INIS-mf—10186, pp 120-127) **Combined experimental-computational method for the verification of cable support systems under dynamic loading.** Kremer, S. (Brown, Boveri und Cie A.G., Mannheim, Germany, F.R.). 1981. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752576. (CONF-810326—).

From Annual meeting on nuclear technology; Dusseldorf, F.R. Germany (24 Mar 1981).

In conventional power plants, cable support systems are unit construction systems combining individual structural components. The use of such cable support systems in nuclear power plants, however, leads to problems which are mainly due to the effects of dynamic loading from external impact. Earthquakes, aircraft crashes and gas cloud explosions are discussed in this context.

47712 (INIS-mf—10187, pp 29-40) **Man as a protective barrier. Requirements from the point of view of the Federal Ministry of the Interior.** Fechner, J. (Bundesministerium des Innern, Bonn, Germany, F.R.). 1980. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752574. (CONF-800386—Pt.1).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

All measures for personnel qualification required by the BMI will not compensate for deficiencies of the working environment of the operating personnel and in a safety-oriented attitude. Correcting human engineering (i.e. adjustment, production and availability before safety) was counteracted. Operational safety can only be improved by assigning a plant commissioner in charge of nuclear safety.

47713 **(INIS-mf—10202) Analytic advanced development in the German Risk Study on Nuclear Power Plants. Papers presented at the project committee session of October 17, 1983, at BMFT.** (Institut fuer Angewandte Oekologie e.V., Freiburg im Breisgau (Germany, F.R.)). May 1984. 70p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752577.

Werkstattreihe. No. 7.

The study carried out by the Ecological Institute (Oeko-Institut) deals with the difficulties encountered with the decision-making models and statistical models and methods of the German Risk Study on Nuclear Power Plants for the determination of care meltdown frequency and for the estimation of the behaviour of components in the event of a failure. Related deficiencies of the German Risk Study and the absence of completeness and lading representiveness of the course and causes of incidents considered are pointed out. The accident consequences model and the climatological-meteorological data base are considered non-representative.

47714 (INIS-mf—10202, pp 1-12) **Scientific technical risk analysis and political decision-making processes.** Cogoy, M. May 1984. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752577.

Werkstattreihe. No. 7.

In Analytic advanced development in the German Risk Study on Nuclear Power Plants. Papers presented at the project committee session of October 17, 1983, at BMFT.

As a precondition for the discussion of the interrelation of risk research and technology-policy decision-making processes one has to concern oneself with the decision-making models used in the discussion on risks. Three such models are described and discussed: a) the model of direct comparison of inherent risks, b) the model discriminating between risk analysis and risk assessment, c) the model of 'risk anatomy' according to W.D. Rowe taking into account the multidimensional character of the term 'risk'. Some typical difficulties of the risk assessment dispute are described in brief. They concern the risk standards, assessment of benefits, risk perception by society, expressed preferences and acceptance of technology-policy decisions.

47715 (INIS-mf—10202, pp 1-8) **Methodological aspects of core meltdown accidents frequency estimates.** Matthis, P. May 1984. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752577.

Werkstattreihe. No. 7.

In Analytic advanced development in the German Risk Study on Nuclear Power Plants. Papers presented at the project committee session of October 17, 1983, at BMFT.

A survey is given of the work of the ecological institute relating to models and methods used in the German Risk Study for the assessment of core meltdown accident frequency. A statistical model used by the ecological institute for the estimation of the outage behaviour of components is taken as a comparison, which leads to the conclusion that no appropriate methods for the assessment of component reliability are available to date. Furthermore, there are no secured methods for error propagation computation. The lower limits for the ranges of reliability of components are calculated by approximation. As a result of imperfect modelling and of a number of methodical inaccuracies and neglects, the German Risk Study underestimates the ranges of component reliability by a factor of 3 to 70 (depending on the type of component).

47716 (INIS-mf—10202, pp 1-6) **Effects of methodic deficiencies on the quantification of core meltdown frequency.** Hahn, L. May 1984. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752577.

Werkstattreihe. No. 7.

In Analytic advanced development in the German Risk Study on Nuclear Power Plants. Papers presented at the project committee session of October 17, 1983, at BMFT.

The application of sequence of events and fault tree analyses for the assessment of the core meltdown frequency raises problems, most of which can be classified under: - Completeness and representativeness of sequences and cuases of events - Modelling of conditional outages (common-mode outages) - Modelling of human behaviour - Reliability data and models. All of the weak points of the German Risk Study related to these problems which are mentioned by the Ecological Institute show a tendency to underestimate the core meltdown frequency by a factor at least 6.

47717 (INIS-mf—10202, pp 1-21) **Model of the consequences of an accident.** Kern, W. May 1984. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752577.

Werkstattreihe. No. 7.

In Analytic advanced development in the German Risk Study on Nuclear Power Plants. Papers presented at the project committee session of October 17, 1983, at BMFT.

Investigations carried by the Ecological Institute on the basis of the accident consequences model of the German Risk Study showed that the statistical statements of this model are not acceptable because they have no representative basis. The partial models of atmospheric diffusion and deposition and of dose calculation for immediate and subsequent damage as well as those of release chronology following an accident and of disaster prevention measures are not representative. Fault range estimates are lacking for all of these partial models.

47718 (INIS-mf—10202, pp 1-7) **Argument about the climatological-meteorological data base of the German Risk Study on Nuclear Power Plants.** Kumm, H. May 1984. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752577.

Werkstattreihe. No. 7.

In Analytic advanced development in the German Risk Study on Nuclear Power Plants. Papers presented at the project committee session of October 17, 1983, at BMFT.

The Ecological Institute's doubts about the representativeness of the climatological-meteorological data base of the German Risk Study concludes that this data base with its 115 'weather sequences' combined with 36 'wind directions' has no defined reference period. The complementary frequency distributions of the German Risk Study do not, therefore, represent statistically secured occurence frequencies for damage caused by accidents. Furthermore, incorrect values for the height of mixing layers used in the German Risk Study were found.

47719 **(JAERI-M—84-237) ROSA-IV large scale test facility (LSTF) system description.** (Japan Atomic Energy Research Inst., Tokyo). Jan 1985. 320p. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703190.

The ROSA-IV Program's large scale test facility (LSTF) is a test facility for integral simulation of thermal-hydraulic response of a pressurized water reactor (PWR) during a small break loss-of-coolant accident (LOCA) or an operational transient. This document provides the necessary background information to interpret the experimental data obtained from the LSTF experiments. The information provided includes LSTF test objectives and approach, the LSTF design philosopy, the component and geometry description, the instrumentation and data acquisition system description, and the outline of experiments to be performed.

47720 **(JAERI-M—85-027) Evaluation report on CCTF core-II reflood test C2-6 (Run 64). Effect of radial power profile.** Akimoto, Hajime; Iguchi, Tadashi; Sugimoto, Jun; Okubo, Tsutomu; Murao, Yoshio; Okabe, Kazuharu. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 97p. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703191.

In order to evaluate the effect of the radial power profile on the system behavior and the core thermal hydraulic behavior during the reflood phase of a PWR LOCA, a test was performed using the Cylindrical Core Test Facility (CCTF) with the flat radial power profile. The test was conducted with the same total core power as that of the steep radial power test C2-5(Run 63). Through the comparisons of the results from these two tests, the following conclusions were obtained: (1) The radial power profile in the core has weak effect on the thermal hydraulic behavior in the primary system except the core. (2) Almost the same differential pressure was observed at various elevations in the periphery of the core regardless of different radial power profile. The result suggests that the core differential pressure is determined mainly by the total power and the total stored energy rather than by the local power and the local stored energy. (3) The test results support the single channel core model with the average power rod used in the reactor safety analysis codes such as REFLA-1DS, WREM for the evaluation of the overall system behavior. (4) In the steep radial power test, the heat transfer coefficient in the central (high power) region was higher than that in the peripheral (low power) region. The tendency was not explained by the estimation with the heat transfer correlation developed by Murao and Sugimoto assuming that the void fraction was uniform in a horizontal cross section. It is necessary to study more the dependency of core heat transfer on the radial power profile in the wide core.

47721 **(JAERI-M—85-029) Main Steam Line break experiment at ROSA III - RUN 953. 100% break with an HPCS failure.** Kawaji, Masahiro; Suzuki, Mitsuhiro; Nakamura, Hideo; Tasaka, Kanji; Anoda, Yoshinari; Kumamaru, Hiroshige; Yonomoto, Taisuke; Murata, Hideo; Shiba, Masayoshi. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 204p. NTIS (US Sales Only), PC A10/MF A01. File Number DE86703184.

This report presents the experimental results of RUN 953, a 100 % Main Steam Line (MSL) break experiment performed at the ROSA-III test facility. The ROSA-III facility is a volumetrically scaled (1/424) system of a BWR/6 used for integral BWR LOCA simulation experiments. RUN 953 is one of several MSL break tests with a 100 % break located upstream of the main steam isolation valve (MSIV), and performed to investigate the effect of an HPCS failure on the system behavior. This test is characterized, just as in a reference MSL break test, RUN 952, by a relatively slower depressurization of the system due to a break flow of high mass quality in comparison with the recirculation line break tests. Continuous flashing of the fluid in the pressure vessel was observed and a decrease in the pressure vessel coolant level eventually led to the uncovery of the entire core at about 200 s after break. After the water level in the downcomer dropped to the L1 level, LPCS and LPCI were activated at 281 s and the core recovered quickly thereafter. The peak cladding temperature reached was 1004 K, which is 252 K higher than that obtained in RUN 952, a reference MSL break test with HPCS actuation logic. This test has demonstrated the importance of HPCS actuation in achieving early core recovery during an MSL break LOCA.

47722 **(JAERI-M—85-037) BWR recirculation loop discharge line break LOCA tests with break areas of 50 and 100% assuming HPCS failure at ROSA-III test facility.** Suzuki, Mitsuhiro; Tasaka, Kanji; Yonomoto, Taisuke; Anoda, Yoshinari; Kumamaru, Hiroshige; Nakamura, Hideo; Murata, Hideo; Shiba, Masayoshi; Iriko, Masanori. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 248p. NTIS (US Sales Only), PC A11/MF A01. File Number DE86703185.

This report presents the experimental results of RUN 962 and RUN 963 in ROSA-III program, which are 50 and 100% break LOCA tests at the BWR recirculation pump discharge line, respectively. The ROSA-III test facility simulates a volumetrically scaled (1/424) BWR system and has four half-length electrically heated fuel bundles, two active recirculation loops, three types of ECCSs and steam and feedwater systems. The experimental data of RUN 962 and RUN 963 were compared with those of RUN 961, a 200% discharge line break test to study the break area effects on the transient thermal hydraulic phenomena. The least flow areas at the jet pump drive nozzles and recirculation pump discharge nozzle in the broken recirculation loop limitted the discharge flows from the pressure vessel and the depressurization rate in the 100 and 200% break tests, whereas the least flow area at break nozzle limitted the depressurization rate in the 50% break test. The highest PCT was observed in the 50% break test among the three tests.

47723 **(NUREG—0827-Suppl.1) Integrated plant safety assessment, Systematic Evaluation Program. La Crosse Boiling Water Reactor (Docket No. 50-409). Supplement No. 1.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Aug 1986. 43p. NTIS, PC A03/MF A01 - GPO. File Number TI86901667.

The Nuclear Regulatory Commission (NRC) has published Supplement No. 1 to the Final Integrated Plant Safety Assessment Report (IPSAR) (NUREG-0827), under the scope of the Systematic Evaluation Program (SEP), for Dairyland Power Cooperative's La Crosse Boiling Water Reactor (LACBWR), located in Vernon County, Wisconsin. The SEP was initiated by the NRC to review the design of older operating nuclear power plants to reconfirm and document their safety. This report documents the review completed under the SEP for those issues that required refined engineering evaluations or the continuation of ongoing evaluations after the Final IPSAR for the LACBWR plant was issued. The review has provided for (1) an assessment of the significance of differences between current technical positions on selected safety issues and those that existed when the LACBWR plant was licensed, (2) a basis for deciding on how these differences should be resolved in an integrated plant review, and (3) a documented evaluation of plant safety when the supplement to the Final IPSAR and the Safety Evaluation Report for converting the license from a provisional to a full-term license have been issued. The Final IPSAR and its supplement will form part of the bases for considering the conversion of the provisional operating license to a full-term operating license.

47724 **(NUREG—0853-Suppl.6) Safety Evaluation Report related to the operation of Clinton Power Station, Unit No. 1 (Docket No. 50-461). Supplement No. 6.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jul 1986. 278p. NTIS, PC A13/MF A01 - GPO. File Number TI86901608.

Supplement No. 6 to the Safety Evaluation Report on the application filed by Illinois Power Company, Soyland Power Cooperative, Inc., and Western Illinois Power Cooperative, Inc., as applicants and owners, for a license to operate the Clinton Power Station, Unit No. 1, has been prepared by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission. The facility is located in Harp Township, DeWitt County, Illinois. This supplement reports the status of items that have been resolved by the staff since Supplement No. 5 was issued.

47725 **(NUREG—1048-Suppl.6) Safety Evaluation Report related to the operation of Hope Creek Generation Station (Docket No. 50-354). Supplement No. 6.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jul 1986. 82p. NTIS, PC A05/MF A01 - GPO. File Number TI86901577.

Supplement No. 6 to the Safety Evaluation Report on the application filed by Public Service Electric and Gas Company on its own behalf as co-owner and as agent for the other co-owner, the Atlantic City Electric Company, for a license to operate Hope Creek Generating Station has been prepared by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission. The facility is located in Lower Alloways Creek Township in Salem County, New Jersey. This supplement reports the status of certain items that has not been resolved at the time of the publication of the Safety Evaluation Report. This supplement supports the issuance of a full-power license to operate Hope Creek Generating Station.

47726 **(NUREG/CR—3262-Vol.2) COBRA-NC: a thermal hydraulics code for transient analysis of nuclear reactor components. Volume 2. COBRA-NC numerical solution methods.** Thurgood, M.J.; George, T.L.; Wheeler, C.L. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1986. Contract AC06-76RL01830. 59p. (PNL—5515-Vol.2). NTIS, PC A04/MF A01 - GPO. File Number TI86010442.

The COBRA-NC computer program has been developed to predict the thermal-hydraulic response of nuclear reactor components to thermal-hydraulic transients. The code solves the multicomponent, compressible three-dimensional, two-fluid, three-field equations for two-phase flow. The three fields are the vapor field, the continuous liquid field, and the liquid drop field. The code has been used to model flow and heat transfer within the reactor core, the reactor vessel, the steam generators, and in the nuclear containment. This volume describes the finite-volume equations and the numerical solution methods used to solve these equations. It is directed toward the user who is interested in gaining a more complete understanding of the numerical methods used to obtain a solution to the hydrodynamic equations.

47727 **(NUREG/CR—3453) Electronic isolators used in safety systems of US nuclear power plants.** Nielsen, J.R. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1986. Contract AC07-76ID01570. 103p. (EGG—2444). NTIS, PC E06/MF A01 - GPO. File Number TI86009873.

Includes 3 sheets of 24c reduction microfiche.

This report presents results from an evaluation program for electronic isolators used in safety systems of US nuclear power plants. Included are recommendations for test methods that can be

used to ensure that isolation devices are being qualified to adequately satisfy IEEE-279 requirements. These recommendations are based on studies made of National Standards; conversations held with utility personnel, Nuclear Steam System Suppliers, Architect Engineers, and the isolator vendor staff; and analysis of actual tests performed on sample isolators. 24 figs.

47728 **(NUREG/CR—4255-Vol.3-No.1) Aerosol release and transport program. Semiannual progress report, October 1985-March 1986. Volume 3, No. 1.** Adams, R.E.; Tobias, M.L. (Oak Ridge National Lab., TN (USA)). Jun 1986. Contract AC05-84OR21400. 47p. (ORNL/TM—9632-Vol.3-No.1). NTIS, PC A03/MF A01 - GPO. File Number TI86012504.

This report summarizes progress for the Aerosol Release and Transport Program sponsored by the Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, Division of Accident Evaluation, for the period October 1985-March 1986. Topics discussed include (1) Aerosol-Moisture Interaction Test (AMIT) experiments 5002 through 5006; (2) efforts to measure the aerodynamic shape factor chi during these experiments; (3) a development test for determining parameters for generating concrete aerosols; (4) data concerning water-vapor generation during plasma torch operation; (5) the use of the ideal gas law in calculating relative humidity; (6) initial comparisons of CONTAIN code results with experimental data for an iron oxide aerosol-steam experiment in the NSPP Facility; (7) pretest predictions using the CONTAIN code for LACE experiment LA-2.

47729 **(NUREG/CR—4587) Source Term Code Package: a user's guide (Mod 1).** Gieseke, J.A.; Cybulskis, P.; Jordan, H.; Lee, K.W.; Schumacher, P.M.; Curtis, L.A.; Wooton, R.O.; Quayle, S.F.; Kogan, V. (Battelle Columbus Div., OH (USA)). Jul 1986. 274p. (BMI—2138). NTIS, PC A12/MF A01 - GPO. File Number TI86901596.

As part of a major reassessment of the release of radioactive materials to the environment (source terms) in severe reactor accidents, a group of state-of-the-art computer codes was utilized to perform extensive analyses. A major product of this source term reassessment effort was a demonstrated methodology for analyzing specific accident situations to provide source term predictions. The computer codes forming this methodology have been upgraded and modified for release and further use. This system of codes has been named the Source Term Code Package (STCP) and is the subject of this user's guide. The guide is intended to provide an understanding of the STCP structure and to facilitate STCP use. The STCP was prepared for operation on a CDC system but is written in FORTRAN-77 to permit transportability. In the current version (Mod 1) of the STCP, the various calculational elements fall into four major categories represented by the codes MARCH3, TRAP-MELT3, VANESA, and NAUA/SPARC/ICEDF. The MARCH3 code is a combination of the MARCH2, CORSOR-M, and CORCON-Mod 2 codes. The TRAP-MELT3 code is a combination of the TRAP-MELT2.0 and MERGE codes.

47730 **(NUREG/CR—4624-Vol.1) Radionuclide release calculations for selected severe accident scenarios. Volume 1. BWR, Mark 1 design.** Denning, R.S.; Gieseke, J.A.; Cybulskis, P.; Lee, K.W.; Jordan, H.; Curtis, L.A.; Kelly, R.F.; Kogan, V.; Schumacher, P.M. (Battelle Columbus Div., OH (USA)). Jul 1986. 240p. (BMI—2139-Vol.1). NTIS, PC A11/MF A01 - GPO. File Number TI86901592.

This report presents results of analyses of the environmental releases of fission products (source terms) for severe accident scenarios in a boiling water reactor of the Mark I containment design. The analyses were performed to support the Severe Accident Risk Reduction/Risk rebaselining Program (SARRP) which is being undertaken for the US Nuclear Regulatory Commission by Sandia National Laboratories. In the SARRP program, risk estimates are being generated for a number of reference plant designs. The Peach Bottom 2 plant has been used in this study as an example of a Mark I BWR plant.

47731 **(NUREG/CR—4624-Vol.2) Radionuclide release calculations for selected severe accident scenarios. PWR, ice condenser design. Volume 2.** Denning, R.S.; Gieseke, J.A.; Cybulskis, P.; Lee, K.W.; Jordan, H.; Curtis, L.A.; Kelly, R.F.; Kogan, V.; Schumacher, P.M. (Battelle Columbus Div., OH (USA)). Jul 1986. 222p. (BMI—2139-Vol.2). NTIS, PC A10/MF A01 - GPO. File Number TI86901593.

This report presents results of analyses of the environmental releases of fission products (source terms) for severe accident scenarios in a pressurized water reactor with an ice-condenser containment. The analyses were performed to support the Severe Accident Risk Reduction/Risk Rebaselining Program (SARRP) which is being undertaken for the US Nuclear Regulatory Commission by Sandia National Laboratories. In the SARRP program, risk estimates are being generated for a number of reference plant designs. The Sequoyah plant has been used in this study as an example of a PWR ice-condenser plant.

47732 **(NUREG/CR—4624-Vol.3) Radionuclide release calculations for selected severe accident scenarios. Volume 3. PWR, subatmospheric containment design.** Denning, R.S.; Gieseke, J.A.; Cybulskis, P.; Lee, K.W.; Jordan, H.; Curtis, L.A.; Kelly, R.F.; Kogan, V.; Schumacher, P.M. (Battelle Columbus Labs., OH (USA)). Jul 1986. 90p. (BMI—2139-Vol.3). NTIS, PC A05/MF A01 - GPO. File Number TI86901589.

This report presents results of analyses of the enviromental releases of fission products (source terms) for severe accident scenarios in a pressurized water reactor with a subatmospheric containment design. The analyses were performed to support the Severe Accident Risk Reduction/Risk Rebaselining Program (SARRP) which is being undertaken for the US Nuclear Regulatory Commission by Sandia National Laboratories. In the SARRP program, risk estimates are being generated for a number of reference plant designs. the Surry plant has been used in this study as the reference plant for a subatmospheric design.

47733 **(NUREG/CR—4624-Vol.4) Radionuclide release calculations for selected severe accident scenarios. Volume 4. BWR, Mark III design.** Denning, R.S.; Gieseke, J.A.; Cybulskis, P.; Lee, K.W.; Jordan, H.; Curtis, L.A.; Kelly, R.F.; Kogan, V.; Schumacher, P.M. (Battelle Columbus Div., OH (USA)). Jul 1986. 167p. (BMI—2139-Vol.4). NTIS, PC A08/MF A01 - GPO. File Number TI86901590.

This report presents results of analyses of the environmental releases of fission products (source terms) for severe accident scenarios in a boiling water reactor with a Mark III containment. The analyses were performed to support the Severe Accident Risk Reduction/Risk Rebaselining Program (SARRP) which is being undertaken for the US Nuclear Regulatory Commission by Sandia National Laboratories. In the SARRP program, risk estimates are being generated for a number of reference plant designs. The Grand Gulf plant has been used in this study as an example of a Mark III plant.

47734 **(NUREG/CR—4624-Vol.5) Radionuclide release calculations for selected severe accident scenarios. PWR, large dry containment design. Volume 5.** Denning, R.S.; Gieseke, J.A.; Cybulskis, P.; Lee, K.W.; Jordan, H.; Curtis, L.A.; Kelly, R.F.; Kogan, V.; Schumacher, P.M. (Battelle Columbus Div., OH (USA)). Jul 1986. 156p. (BMI—2139-Vol.5). NTIS, PC A08/MF A01 - GPO. File Number TI86901591.

This report presents results of analyses of the environmental releases of fission products (source terms) for severe accident scenarios in a pressurized water reactor with a large dry containment. The analyses were performed to support the Severe Accident Risk Reduction/Risk Rebaselining Program (SARRP) which is being undertaken for the US Nuclear Regulatory Commission by Sandia National Laboratories. In the SARRP program, risk estimates are being generated for a number of reference plant designs. The Zion plant has been used in this study as an example of a large dry containment PWR design.

47735 **(NUREG/CR—4657) Prediction of pool void fraction by new drift flux correlation.** Kataoka, I.; Ishii, M. (Argonne National Lab., IL (USA). Reactor Analysis and Safety Div.). Jun 1986. Contract W-31-109-ENG-38. 79p. (ANL—86-29). NTIS, PC A05/MF A01 - GPO. File Number TI86013313.

A void fraction for a bubbling or boiling pool system is one of the important parameters in analyzing heat and mass transfer processes. Using the drift flux formulation, correlations for the pool void fraction have been developed in collaboration with a large number of experimental data. It has been found that the drift velocity in a pool system depends upon vessel diameter, system pressure, gas flux and fluid physical properties. The results show that the relative velocity and void fraction can be quite different from those predicted by conventional correlations. In terms of the rise velocity, four different regimes are identified. These are bubbly, churn-turbulent, slug and cap bubble regimes. The present correlations are shown to agree with the experimental data over wide ranges of parameters such as vessel diameter, system pressure, gas flux and physical properties. 39 refs., 41 figs.

47736 **(ORNL/CSD/TM—231) Adjoint-based sensitivity analysis for reactor safety applications.** Parks, C.V. (Oak Ridge National Lab., TN (USA)). Aug 1986. Contract AC05-84OR21400. 236p. NTIS, PC AA11/MF A01; 1; GPO Dep. File Number DE86014418.

The application and usefulness of an adjoint-based methodology for performing sensitivity analysis on reactor safety computer codes is investigated. The adjoint-based methodology, referred to as differential sensitivity theory (DST), provides first-order derivatives of the calculated quantities of interest (responses) with respect to the input parameters. The basic theoretical development of DST is presented along with the needed general extensions for consideration of model discontinuities and a variety of useful response definitions. A simple analytic problem is used to highlight the general DST procedures. finally, DST procedures presented in this work are applied to two highly nonlinear reactor accident analysis codes: (1) FASTGAS, a relatively small code for analysis of a loss-of-decay-heat-removal accident in a gas-cooled fast reactor, and (2) an existing code called VENUS-II which has been employed for analyzing the core disassembly phase of a hypothetical fast reactor accident. The two codes are different both in terms of complexity and in terms of the facets of DST which can be illustrated. Sensitivity results from the adjoint codes ADJGAS and VENUS-ADJ are verified with direct recalcualtions using perturbed input parameters. The effectiveness of the DST results for parameter ranking, prediction of response changes, and uncertainty analysis are illustrated. The conclusion drawn from this study is that DST is a viable, cost-effective methodology for accurate sensitivity analysis. In addition, a useful sensitivity tool for use in the fast reactor safety area has been developed in VENUS-ADJ. Future work needs to concentrate on combining the accurate first-order derivatives/results from DST with existing methods (based solely on direct recalculations) for higher-order response surfaces.

47737 **(ORNL/TM—10094) Current status of decay heat measurements, evaluations, and needs.** Dickens, J.K. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014338.

Over a decade ago serious concern over possible consequences of a loss-of-coolant accident in a commercial light-water reactor prompted support of several experiments designed specifically to measure the latent energy of beta-ray and gamma-ray emanations from fission products for thermal reactors. This latent energy was termed Decay Heat. At about the same time the American Nuclear Society convened a working group to develop a standard for use in computing decay heat in real reactor environs primarily for regulatory requirements. This working group combined the new experimental results and best evaluated data into a standard which was approved by the ANS and by the ANSI. The primary work since then has been: (a) on improvements to computational efforts and (b) experimental measurements for fast reactors. In addition, the need for decay-heat data has been extended well beyond the time regime of a loss-of-coolant accident; new concerns involve, for example, away-from-reactor shipments and storage. The efficacy of the ANS standard for these longer time regimes has been a subject of study with generally positive results. However, a specific problem, namely, the consequences of fission-product neutron capture, remains contentious. Satisfactory resolution of this problem merits a high priority. 31 refs., 4 figs., 1 tab.

47738 **(SAND—84-1341) Development of ultrasonic thermometry for high-temperature high-resolution temperature profiling applications in LMFBR safety research.** Field, M.E. (Sandia National Labs., Albuquerque, NM (USA)). May 1986. Contract AC04-76DP00789. 73p. NTIS, PC A04/MF A01 - GPO. File Number TI86013165.

Ultrasonic thermometry has been developed as a high temperature profiling diagnostic for use in the LMFBR Debris Coolability Program at Sandia National Laboratories. These instruments have been used successfully in the dc series experiments and the D10 experiment. Temperatures approaching 3000°C with spatial resolution of 10 mm and indicated temperature gradients of 700°C/cm have been measured. Instruments have operated in molten sodium, molten steel, and molten UO_2 environments. Up to 14 measurement zones on a single instrument in molten sodium have been used with 12 mm and 15 mm spatial resolution. Hermetically sealed units operated at elevated temperatures have been used. Posttest examination has revealed very little systematic calibration drifts (<10°C) with random drifts occurring with less than 40°C standard deviation in a 10 to 12 mm measurement zone. The stability of the system varies from +-1°C to +-15°C depending on the sensor design constraints for a particular application. Doped tungsten sensors have been developed to permit operation of total measurement zone lengths of 30 cm at temperatures above 2500°C. 33 refs., 13 figs.

47739 **(TPR-NS—27-No.1) Nuclear Safety technical progress review, January-March 1986. Volume 27, No. 1.** (Oak Ridge National Lab., TN (USA)). 1986. 158p. I. File Number TI85017984.

Separate abstracts were prepared for 6 papers in this report. (JDB)

47740 **(UCID—20834) ARAC response to the Chernobyl reactor accident.** Dickerson, M.H.; Sullivan, T.J. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 34p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014750.

This report summarizes the assessments provided by ARAC during the first two weeks after the Chernobyl reactor accident began. Results of this work and measurements made by European countries during that same period show that no major short-term acute health effects would be expected in Europe as a result of this accident. Statistical long-term health effects were not addressed in these studies. Both measured and calculated I-131 concentrations in milk in the US were over an order of magnitude below the USDA guideline of 15,000 pCi/l.

47741 **Summary of the Knoxville International Topical Meeting on Fast Reactor Safety.** Levin, A.E. (Oak Ridge National Lab., TN). 27: No. 1, 1-13(Jan-Mar 1986).

This article reports on the International Topical Meeting on Fast Reactor Safety, held April 21-15, 1985, in Knoxville, Tennessee. The most recent in a continuing series of such conferences sponsored by the American and European Nuclear Societies, this meeting also had the support of the Atomic Energy Society of Japan; the International Atomic Energy Agency; and numerous research, industrial, and government organizations in the United States. The emphasis of the meeting was on the design and operational aspects of fast reactor safety, reflecting the movement away from concentration on severe accidents that has occurred internationally over the last several years. More than 200 persons from the United States, Europe, and Asia attended the conference, at which over 120 papers were presented, including comprehensive reviews of fast reactor safety programs in the United States, Japan, France, the Federal Republic of Germany, and the United Kingdom.

47742 **Analysis and evaluation of recent operational experience from the Fort St. Vrain HTGR.** Moses, D.L.; Lanning, W.D. (Oak Ridge National Lab., TN; Nuclear Regulatory Commission, Washington, DC). 27: No. 1, 58-67(Jan-Mar 1986).

The Nuclear Regulatory Commission's (NRC's) Office for Analysis and Evaluation of Operational Data (AEOD) has established an extensive program for screening, analyzing, and evaluating the operational experience data from all commercial nuclear power plants in the United States. This program is designed to provide feedback from field experience with actual operating events to NRC's continuing efforts to ensure the public's health and safety. Oak Ridge National Laboratory provides technical assistance to AEOD to evaluate the operating experience for Fort St. Vrain. The operating experience discussed includes notable safety-related events that have occurred since late 1981. Different events have been grouped according to the major plant system affected by the occurrence, including primary coolant system, electrical systems, and reactor building. 16 refs.

47743 **Energy and water development appropriations for 1987. Part 9. Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, Ninety-Ninth Congress, Second Session.** Washington, DC; Government Printing Office (1986). 279p.

Part nine of the hearing record covers testimony pertaining to activities of DOE and the Nuclear Regulatory Commission (NRC). Seven witnesses from DOE, including representatives of the Richland and Savannah River facilities, testified on the safety of US reactors in response to concerns about the Chernobyl accident. At issue was whether US research or power reactors are vulnerable to a similar kind of accident. Witnesses noted DOE's safety record, its recent reviews of oversight procedures, and modifications to correct possible weaknesses in those procedures. Technical safety appraisals at Savannah River were made earlier than originally planned, and other studies will be conducted to ensure that design and engineering will minimize the possibility of an accident. NRC Commissioners and regulators testified at the second day of hearings to describe its efforts to understand what happened at Chernobyl and to outline the differences between the Soviet and US reactors.

47744 **(DOE-tr—6901172) Reporting criteria for abnormal events at nuclear power plants.** (Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Koeln (Germany, F.R.)). Sep 1985. Translation source information not available . 30p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86901172.

At its meeting on May 30/31, 1985, the Federal States Committee for Nuclear Energy adopted the revised version of the Reporting Criteria for Abnormal Events at Nuclear Power Plants. The corresponding resolution is described.

47745 **S. 1225: a bill to amend the Atomic Energy Act of 1954, as amended, to establish a comprehensive, equitable, reliable, and efficient mechanism for full compensation of the public in the event of an accident... Introduced in the Senate of the United States, Ninety-Ninth Congress, Second Session, May 24, 1985.** Washington, DC; Government Printing Office (1985). 51p.

The Price-Anderson Act Amendments Act of 1986 amend the Atomic Energy Act of 1954 to improve the procedures for compensating the victims of accidents involving nuclear materials by DOE contractors or Nuclear Regulatory Commission (NRC) licensees. The purpose is to establish a mechanism that will be comprehensive, equitable, reliable, and efficient. The amount of financial protection required is the amount of liability insurance available from private sources, although the NRC may establish criteria for a lesser amount. The bill outlines new procedures for indemnifying contractors and prohibits punitive damages beyond the established liability.

25 ENERGY STORAGE

2501 Magnetic

47746 **Superconducting magnetic energy storage for asynchronous electrical systems.** Boenig, H.J. (to Dept. of Energy, Washington, DC). US Patent 4,599,519. 8 Jul 1986. Filed date 16 May 1984. vp.

An apparatus is described for providing superconducting magnetic energy storage for both a first and a second asynchronous electric system comprising: (a) a first converter connected to and associated with the first asynchronous electrical system, the first converter having a first and a second conductor output; (b) a second converter connected to and associated with the second asynchronous electrical system, the second converter having a first and a second conductor output, the second conductor output connected to the second conductor output of the first converter; (c) a interphase reactor having a first and a second end terminal and a tapped terminal therebetween, the first end terminal connected to the first output conductor of the first converter and the second end terminal connected to the first output conductor of the second converter; (d) a superconducting magnetic electric storage device connected between the tapped terminal of the interphase reactor and the second output conductors of the first and second converters; and (e) means for controlling the first and second converters whereby either asynchronous electric system may charge the superconducting magnetic energy storage device and either asynchronous electrical system may receive the energy stored therein.

47747 **Design and operating experience of an AC-DC power converter for a superconducting magnetic energy storage unit.** Boenig, H.J.; Nielsen, R.G.; Sueker, K.H. (Los Alamos National Lab., Los Alamos, NM). pp 772-778 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—).

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

The design philosophy and the operating behavior of a 5.5 kA, +.2.5 kV converter, being the electrical interface between a high voltage transmission system and a 30 MJ superconducting coil, are documented in this paper. Converter short circuit tests, load tests under various conditions, dc breaker tests for magnet current interruption, and converter failure modes are described.

2503 Pumped Hydro

REFER ALSO TO CITATION(S) 47379

2506 Thermal

REFER ALSO TO CITATION(S) 47480

47748 **(BMFT-FB-T—86-007) VSI-elements for cover in large heat storage systems. Final report.** Seefeldt, D.; Timm, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); ERNO Raumfahrttechnik G.m.b.H., Bremen (Germany, F.R.)). Jan 1986. 93p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752546.

Energy saving can be performed by storing heat in large hot-water basins. The aim of this project was to present a floating and insulating cover to prevent heat losses of such heat storage systems. This cover was based on vacuum superinsolated elements which were to be developed and built. Tests will be performed within the EAB project 03E-4502A. The cover was submitted to the EAB beginning 1984. A built-in, as well as tests were not possible until now due to technical problems within the EAB project. This will be foreseen in 1985 and will be documented by project (03E-4502A). With 29 figs.

47749 **(EPRI-EM—4722) Market constraints for residential cool storage systems. Final report.** Asbury, J.G.; Giese, R.F.; Looney, Q. (QLA, Inc., Washington, DC (USA)). Jul 1986. 179p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920429.

Residential air conditioning represents a significant and growing component of peak demand met by the Nation's electric utilities. Shifting this demand into off-peak hours through the application of thermal energy storage offers technical appeal, but the economic implications are uncertain. The purpose of this project was to estimate the magnitude of utility cost savings which might be realized through shifting residential space cooling off peak, establish cost and performance goals for the cool storage equipment and set a rough minimum size for the residential cool storage market. These objectives were met through analyses of data and information obtained from the literature, through a workshop attended by utility personnel and equipment manufacturers and designers, and from 29 utility companies. Twenty-one of the participating utilities applied a simplified assessment methodology developed during this project and supplied to them on a computer disk suitable for the IBM-PC. The results indicate that a market for cool storage equipment of $650 million to nearly $3 billion in 1984 dollars over a 10-year period is possible. The lower end of this range, which represents a market of 327,000 units, would be expected to cut noncoincident demand by 958 MW and yield over $150 million in annual benefits to the surveyed electric utilities and their customers in 1993.

2509 Batteries

REFER ALSO TO CITATION(S) 48148, 48150

47750 **(CONF-860688—5) Advanced lithium-aluminum/iron disulfide secondary cell.** Kaun, T.D. (Argonne National Lab., IL (USA). Chemical Technology Div.). 1986. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014498.

From 32. NASA/US Army international power sources symposium; Cherry Hill, NJ, USA (8 Jun 1986).

The use of the dense UP-FeS_2 electrode and the lower-melting LiCl-LiBr-KBr electrolyte has eliminated the capacity-loss problem of the Li-Al/FeS_2 system; with LiCl-KCl electrolyte, the cell would have lost 30% of its capacity in the first 200 cycles. At the same time, the cell performance has been increased significantly. Based on the improved performance, a 250-Ah monopolar cell is expected to achieve a specific energy of 175 Wh/kg at a 4-h rate and specific power of 200 W/kg at 80% DOD. An advanced bipolar battery design has a projected capability of 200 Wh/kg at a 1-h rate with 600 W/kg at 80% DOD, and a battery specifically designed for continuous high power output is projected to provide greater than 2000 W/kg. These bipolar batteries can be operated nearly isothermally because the unique entropic cooling of the upper-plateau FeS_2 discharge reaction cancels I^2R heating. The dense upper-plateau FeS_2 cell with its high performance and durability poses exciting possibilities for demanding battery applications such as electric vehicles, stationary energy storage, and satellites.

47751 **(CONF-8604116—5) Failure analysis of lithium-aluminum/iron sulfide cells.** Battles, J.E. (Argonne National Lab., IL (USA). Chemical Technology Div.). May 1986. Contract W-31109-ENG-38. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014574.

From International workshop on high temperature molten salt batteries; Argonne, IL, USA (16 Apr 1986).

Post-test examinations were an integral part of the Li-alloy/FeS battery development program at Argonne National Laboratory. Important functions of post-test examinations were to determine the causes of cell failure and to provide recommendations on cell design and assembly techniques that would eliminate these failure modes. Cell failure was generally indicated by a sharp decline in the coulombic efficiency, which is the manifestation of an electrical short circuit between the positive and negative electrodes. Combinations of macroscopic and microscopic examinations were utilized to identify the source and cause of the short circuits. A special metallographic glovebox facility with a helium atmosphere was constructed for these examinations. Cell failure analysis was conducted on bicells (<100-Ah capacity) from the early cell development program and on multiplate cells (about 200- and 400-Ah capacity) from the Mark IA and Mark II battery development programs. Results of the cell failure analysis for the bicell (~163 cells) and for the Mark IA multiplate cells are briefly summarized here.

47752 **(DOE/CE—0121/1) Electrochemical energy storage program. Annual progress report, October 1, 1984-September 30, 1985.** (USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC. Office of Energy Storage and Distribution). Jan 1986. 45p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014953.

Research on the following topics is summarized: metal/air batteries, ambient temperature lithium batteries, sodium/sulfur batteries, lithium/iron sulfide batteries, fuel cells, hydrogen/nickel oxide batteries, flow batteries. (DLC)

47753 **(N—86-25039) Principles for system level electrochemistry.** Thaller, L.H. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 13p. (NASA-TM—87283; E—2908; CONF-860913—2). NTIS, PC A02/MF A01.

From International power sources symposium; Brighton, UK (8 Sep 1986).

The higher power and higher voltage levels anticipated for future space missions have required a careful review of the techniques currently in use to preclude battery problems that are related to the dispersion characteristics of the individual cells. Not only are the out-of-balance problems accentuated in these larger systems, but the thermal management considerations also require a greater degree of accurate design. Newer concepts which employ active cooling techniques are being developed which permit higher rates of discharge and tighter packing densities for the electrochemical components. This paper will put forward six semi-independent principles relating to battery systems. These principles will progressively address cell, battery and finally system related aspects of large electrochemical storage systems.

47754 **(N—86-25046) Long life nickel electrodes for a nickel-hydrogen cell: cycle life tests.** Lim, H.S.; Verzwyvelt, S.A. (Hughes Research Labs., Malibu, CA (USA)). 1985. 14p. (NASA-CR—174815). NTIS, PC A02/MF A01.

In order to develop a long life nickel electrode for a Ni/H_2 cell, the cycle life of nickel electrodes was tested in Hi/H_2 boiler plate cells. A 19 test cell matrix was made of various nickel electrode designs including three levels each of plaque mechanical strength, median pore size of the plaque, and active material loading. Test cells were cycled to the end of their life (0.5v) in a 45 minute low Earth orbit cycle regime at 80% depth-of-discharge. It is shown that the active material loading level affects the cycle life the most with the optimum loading at 1.6 g/cc void. Mechanical strength does not affect the cycle life noticeably in the bend strength range of 400 to 700 psi. It is found that the best plaque is made of INCO nickel powder type 287 and has median pore size of 13 micron.

47755 **(SAND—86-7115C) Strength improvement in beta" alumina by incorporation of zirconia.** Heavens, S.N. (Sandia National Labs., Albuquerque, NM (USA); Chloride Silent Power Ltd., Runcorn (UK)). 1986. Contract AC04-76DP00789. 15p. (CONF-860968—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013575.

From 3. international conference on the science of technology of zirconia; Tokyo, Japan (9 Sep 1986).

Beta" alumina ceramic electrolytes for use in Na/S batteries are inherently weaker than most engineering ceramics due to the presence of weakly-bonded conduction planes in the crystal structure and to difficulties in controlling grain growth during firing. Substantial improvement in microstructural control is obtained by incorporation of m-ZrO_2 or PSZ, resulting in increases in strength and fracture toughness to around 350 MPa and 4 MPam/sup 1/2/ respectively. PSZ may adversely influence the electrical resistivity of the ceramic owing to the presence of impurities. With most zirconia powders a high level of retention of t-ZrO_2 is obtained at levels of addition up to 15% by weight ZrO_2. At these levels

ZrO_2/β''-Al_2O_3 ceramics show low resistivity and stable resistance in Na/S cells.

47756 **Beta″-alumina solid electrolytes.** DeJonghe, L.C. (Lawrence Berkeley Lab.). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

Sodium beta″-alumina is used as a solid electrolyte in high energy-density electrical storage batteries. A variety of degradation processes may limit the performance of the electrolyte. Factors affecting rapid and slow degradation, including the effects of microstructure and of oxygen and water, are discussed. The results indicate that microstructural control and chemical purity should enhance cell life.

47757 **Ceramic electrolytes for energy storage.** DeJonghe, L.C. (Lawrence Berkeley Labs., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

Ceramic sodium beta″-alumina solid electrolytes are used as ion-permeable membranes in sodium-sulfur cells. The factors that determine the successful, long-term operation of the electrolyte at 300 to 350°C are discussed. The most important elements for longevity of the battery are the control of the microstructure of electrolyte and the maintenance of chemical purity during cell operation.

47758 **Performance evaluation of nickel-cadmium cell separator material.** Timmerman, P.J. (Martin Marietta Corp., Denver, CO). pp 1.109-1.113 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

The performance evaluation of a new aerospace quality nickel-cadmium battery cell separator material is crucial for the aerospace industry to accept a replacement for the diminishing supply of Pellon 250ML, the industry standard. Two ten cell groups of standard ten Ampere-Hour cells, containing Frudenburg 2117 and Pellon 2536 separator materials are being evaluated. Each ten cell group contains three cells utilizing Pellon 2505ML as the control. The Frudenburg group has completed receiving and characterization tests, and over 5000 accelerated LEO cycles at 40 percent DOD. The Pellon 2536 group is currently in characterization testing. The data gathered thus far on the Frudenburg cell group indicates marginally inferior performance compared to the Pellon 2505 control group. Early results suggest that the Pellon 2536 will be an acceptable separator material for aerospace applications. 11 references.

47759 **Mission and status of the U.S. Department of Energy's battery energy storage program.** Quinn, J.E.; Landgrebe, A.R.; Hurwitch, J.W.; Hauser, S.G. (DOE, Washington, DC; Battelle Pacific Northwest Labs., Richland, WA). pp 2.3-2.10 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

Attention is given to the U.S. Department of Energy's battery energy storage program history, assessing the importance it has had in the national interest to date in industrial, vehicular, and electric utility load leveling applications. The development status of battery technology is also evaluated for the cases of sodium-sulfur, zinc-bromine, zinc-ferricyanide, nickel-hydrogen, aluminum-air, lithium-metal disulfide, and fuel cell systems. Development trends are projected into the foreseeable future. 13 references.

47760 **Design and cost study of a 15 kWh hydrogen/nickel oxide battery for photovoltaic applications.** Sindorf, J.F.; Burant, L.J.; Dunlop, J.D. (COMSAT Labs., Clarksburg, MD). pp 2.177-2.184 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

A 7.5 volt (6-cell) 100 AH hydrogen-nickel oxide battery has been built which exhibits the potential for long cycle life and zero maintenance, characteristics similar to those of aerospace cells, but at a significantly lower cost. The approach used in the design of this battery was to incorporate, in a prismatic configuration, less expensive raw materials and fabrication processes to reduce manufacturing costs. In particular, the use of mass production techniques with economics similar to those used in the assembly of lead/acid SLI batteries were investigated.

47761 **Lithium/metal sulfide molten salt batteries: Present status and future potential.** Steunenberg, R.K. (Chemical Technology Div., Argonne National Lab., 9700 S. Cass Avenue, Argonne, IL 60439). pp 320-326 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

Electrically rechargeable high temperature lithium-alloy/metal sulfide batteries with molten salt electrolytes are being developed, primarily for electric vehicle applications. The battery cells consist of Li-Al, Li-Si, or other similar negative electrodes, and positive electrodes containing iron or other metal sulfides as the active material. The current performance of such cells is summarized as a specific energy of about 100 Wh/kg at the 3-h discharge rate, a specific power of approximately 130 W/kg at 50% state of charge and a lifetime of 800-1000 cycles.

47762 **Polyacetylene batteries.** MacDiarmid, A.G. (Dept. of Chemistry, Univ. of Pennsylvania, Philadelphia, PA 19104). pp 31-35 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

Polyacetylene, (CH)/sub x/, the prototype conducting polymer, is the simplest possible conjugated organic polymer. It can be prepared by the polymerization of acetylene gas in the form of silvery flexible films whose conductivity can be readily increased by $\approx$12 orders of magnitude (from $\approx 10^{-9}$ to $\approx 10^{3}$ ohm^{-1} cm^{-1}) by controlled chemical or electrochemical oxidation or reduction. A number of studies during the past four years have demonstrated that polyacetylene and possibly other conducting polymers might serve as good electrode active materials in rechargeable storage batteries employing nonaqueous electrolytes. Neutral polyacetylene, partly oxidized polyacetylene, (CH^{+}/sup Y/A^{-}/sub y/)/sub x/, and partly reduced polyacetylene, [M^{+}/sub y/(CH^{-}/sup y/)]/sub x/, where A^{-} and M^{+} are monovalent anions and cations respectively, have been employed in various combinations both with themselves or with other anode- or cathode-active materials.

47763 **Advanced lead-acid batteries.** Bowman, D.E. (Argonne National Lab.). pp 19-22 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

The theoretical capacity of the PbO_2 active material (PAM) is 224 Ah/kg. In 1977, a typical Globe deep cycle battery would exhibit a specific energy of 29 Wh/kg or 59.5 Ah/kg AM. Years of research and development via the Argonne program resulted in substantially increasing the specific energy to 41 Wh/kg (77.2 Ah/kg PAM) with the successful design of an "Improved-State-of-the-Art" (ISOA) battery system. However, this represented only a 34.5% utilization of the positive active materials. The early development work on advanced battery systems required new approaches as the numerous electrical performance goals proved to be in design conflict with one another. It was soon apparent that it would be impossible to meet the goals if traditional design practices were incorporated. One of the more difficult challenges was to meet the extended cycle life requirements under a repetitive, deep

depth-of-discharge (DOD) test regime (800 life cycles at 80% DOD).

47764 **High rate performance of a reserve lithium thionyl chloride multicell battery.** Garoutte, K.F.; Horning, R.J. (Honeywell Power Sources Center, 104 Rock Road, Horsham, PA 19044). pp 99-103 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

Progress in the high energy lithium thionyl chloride (Li/$SOCl_2$) technology has been such that reserve batteries employing this electrochemistry can now be called upon to fulfill applications previously specifying thermal batteries. These applications typically demand reserve batteries having rapid rise time, high power capability, with operational life profiles extending from minutes up to one to two hours or longer. Typically, the longer life requirements, coupled with the undesirable heat associated with thermal batteries are the major factors which bring the Li/$SOCl_2$ reserve technology to the forefront. A 16-volt Li/$SOCl_2$ reserve battery using recent high power technology has been developed for Sandia National Laboratories by Honeywell Power Sources Center for employment in one such thermal battery application.

47765 **Research on lead dioxide: Recent results.** Varma, R. (Argonne National Lab., 9700 South Cass Avenue, Argonne, IL 60439). pp 197-200 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

Electrochemically active PbO_2 can be described as a defect solid. The defects are derived from incorporation of hydrogens in PbO_2 and the nonstoichiometry of the material. The relationship of the defect structure to the morphology of PbO_2 is not understood at the present time. The relationships of the defect structures to lead-acid positive plate capacity and cyclic performance constitute areas for future research.

47766 **Lead-acid battery negative: A review.** Mahato, B.K. (Johnson Controls, Inc., 5757 North Green Bay Ave., Milwaukee, WI 53201). pp 212-218 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

The negative electrode of a lead-acid battery has a lead alloy current collector and a high surface area, porous, spongy lead mass as active material. The developmental work on this electrode has remained limited partly because of the more pressing work needed to solve problems associated with the positive lead dioxide electrode, which for all practical applications except cold temperature and high rate discharge, limits the battery performance. More recently, because the lead-acid battery is being seriously considered for electric vehicle propulsion, solar energy storage and load-leveling applications under Department of Energy (DOE) sponsored programs, numerous attempts are being made to increase its energy density and cycle life. The weight of the negative electrode, which uses highly conductive lead as active material, is being reduced by decreasing the weight of the current collector grid and the active material; the former by grid design optimization and the latter by increasing the material utilization or mass reactivity. DOE has set as an objective for the advanced lead-acid battery to increase its energy density close to 60 Wh/Kg and cycle life to 1000 at 80 percent DOD per cycle. This review covers the lead electrode developmental work since 1970 with special emphasis on the (i) lead-plastic composite grid development, (ii) material utilization improvement, (iii) the effect of trace impurities, and (iv) failure processes.

47767 **Characterization of the surfaces of manganese oxides by water adsorption.** Fraioli, A.V. (Argonne National Lab., CMT 205, 9700 S. Cass Ave., Argonne, IL 60439). pp 147-150 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

The surface properties of a variety of synthetically prepared manganese oxides have been studied by water adsorption at 20°C. Isotherms were constructed from data obtained gravimetrically on samples equilibrated in airfilled humidistats. In each humidistat the partial pressure of the water vapor was fixed by the vapor pressure of a particular saturated salt solution. For samples activated in vacuo at 125°C, first layer adsorption exhibited strong physical or chemical bonding. Subsequent adsorption exhibited dominant Type III adsorption features characteristic of weak adsorbate/absorbent interaction.

47768 **Methods of electrolyte agitation and effects on the discharge and charge behavior of lead-acid batteries.** Tomantschger, K. (The Kenneth E. Johnson Environmental and Energy Center, Univ. of Alabama in Huntsville, AL 35899). pp 181-186 of Progress in batteries and solar cells. Volume 5. Shimotake, H. Cleveland, OH; JEC Press, Inc. (1984).

Several concepts for eliminating electrolyte stratification in conventional lead-acid batteries were tested by UAH. The system which proved to be the most promising is an air-lift pump retrofit system which can be attached from the outside of the battery. When operating the pump with air pulses, specific gravity differences in the top and bottom electrolytes can be avoided. The charge time is reduced, charge efficiency increased, and lifetime has been proven to increase. The water loss during charge declines. Using a battery with a thin separator, the flow is forced down along the plates and the discharge capacity was found to increase.

29 ENERGY PLANNING AND POLICY

2901 Energy Analysis And Modeling

REFER ALSO TO CITATION(S) 47787, 47798, 47799, 47800, 47801, 47802, 47805, 47807, 47808, 47809, 47811, 47812, 47834, 47847, 47848, 47851, 47852, 47853, 47870

47769 **(EUR—10352-EN) EXODUS - a program for the economic evaluation of energy exchange opportunities in industrial sites. Final report.** Wouters, G.; Hermans, J.; Pastuer, E.; Wegener, W. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1985. 144p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energy.

The purpose of the present study is the development of a selection model allowing identification and evaluation of potential energy exchange and energy integration opportunities in existing industrial sites. The model gives a preliminary estimation of potential energy and cost savings for the companies involved. A selection and evaluation model has been developed and has been implemented on an IBM 4341/2 computer. The computer program EXODUS (Energy Exchange Opportunities in industrial Sites) has been conceived as a modular and interactive system. The validity of the EXODUS model has been demonstrated on three different pilot sites in cooperation with the companies involved and with local authorities. Special attention has been given to the testing of different data collection procedures. An on site data collection in combination with a general energy audit e.g. an energy bus audit is proposed as the most appropriate data collection procedure.

2902 Economics And Sociology

REFER ALSO TO CITATION(S) 47176, 47219, 47372, 47769, 47788, 47789, 47790, 47791, 47792, 47793, 47794, 47796, 47797, 47803, 47810, 47811, 47813, 47816, 47841, 47842, 47844, 47845, 47849, 47850

47770 **(IIUG/dp—85-23) Technological development with reference to hydro-power, nuclear, and alternative energy technologies.** Burns, T.R.; Baumgartner, T. (Wissenschaftszentrum Berlin (Germany, F.R.). Internationales Inst. fuer Umwelt und Gesellschaft; Uppsala Univ. (Sweden)). 1985. 89p. NTIS (US Sales Only), PC A05/MF A01. File Number DE86752562.

This report outlines a theoretical framework for describing and analyzing the introduction of new technologies and the development of socio-technical systems associated with such innovations. While the report is largely theoretical in nature, it refers to certain strategic aspects of the development of nuclear, hydro-power and

alternative energy systems. The ease with which technological innovation and development occur, the directions they take, and the impacts they have on the social and physical environments depend not only on purely technical and economic factors. Barriers, regulators and facilitators are inherent in the socio-political, institutional and cultural structures within which any attempts at innovation and technological development take place. The final section of the report explores some of the implications of the theory for policy and strategy, including consideration of environmental policy.

47771 **Imperfectly competitive equilibria in international commodity markets.** Kolstad, C.D.; Burris, A.E. (Univ. of Illinois, Urbana). *American Journal of Agricultural Economics;* **68**: No. 1, 27-36(Feb 1986).

From AAEA annual meeting; Reno, NV, USA (27-30 Jul 1986).

The simple model of perfect competition in spatial markets has been widely applied in analyzing international agricultural trade. Yet, many markets do not appear to be perfectly competitive. This paper offers a new and efficient method for computing spatial equilibrium in oligopolistic or oligopsonistic markets. The authors apply the technique to an analysis of several hypotheses of market conduct in the international wheat market that have been put forward by other authors. They conclude that a Cournot-Nash duopsony model does not perform well in explaining trade.

47772 **Department of Energy posture hearing. Hearing before the Committee on Science and Technology, US House of Representatives, Ninety-Ninth Congress, Second Session, February 19, 1986.** Washington, DC; Government Printing Office (1986). 83p.

Energy Secretary John S. Herrington was the principal witness at a hearing held to review the DOE budget request for fiscal year 1987, the first year to feel the effects of the Gramm-Rudman-Hollings legislation. The DOE requests a 20% increase in weapons research funding and a 60% decrease in conservation programs and a 50% cut in fusion research activity. Committee members challenged the assumption that energy problems are no longer pressing because of low oil prices, and suggested that the current lull presents an opportunity to prepare for the next crisis in energy supply and price. Herrington responded with an overview of the budget, which he described as lean and focused. Research funding emphasizes basic research and the need to overcome technological barriers, defederalization, and an open market approach.

2903 Environment, Health, And Safety

REFER ALSO TO CITATION(S) 47194, 47195, 47300, 47301, 47326, 47327, 47328, 47330, 47331, 47334, 47336, 47339, 47813, 48228, 48661, 48667, 48683, 48702, 48711, 48731, 48743, 48746, 48747, 48748, 48750, 48752, 48782, 48783, 48784, 48785, 48786, 48787, 48788, 48789, 48929

47773 **(BNL—38299) Joint IAEA/UNEP/WHO project on assessing and managing health and environmental risks from energy and other complex industrial systems.** (Brookhaven National Lab., Upton, NY (USA). Applied Science Dept.). 1985. Contract AC02-76CH00016. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014184.

The project comprises four main activities, namely: (1) the development of a guide to procedures for risk management and hazard control, drawing on results from a number of case studies which will be carried out in Member States; (2) the establishment and operation of a system for the collection, evaluation and distribution of information concerning methods and, as required, health and environmental effects; (3) the training of personnel in risk management and hazard control; and (4) the promotion of an approach to risk management and hazard control, and procedures for the planning of energy production and use and of other complex technologies, at the national level. Each of these activities is described in detail.

47774 **(ORAU—262) Profile of criticality safety professionals in the Department of Energy contractor system.** Crowell, M.R.; Trice, J.L. (Oak Ridge Associated Universities, Inc., TN (USA)). Jan 1986. Contract AC05-76OR00033. 74p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014201.

Results are reported from a survey of 178 criticality safety professionals within the DOE contractor system. Data are presented on the group's demographics, work experience, areas of specialization, professional development, and use of ANS/ANSI standards and selected reference documents.

47775 **(PB—86-200151/XAB) Hazards: technology and fairness. Series on technology and social priorities.** (National Academy of Engineering, Washington, DC (USA)). 1986. 123p. NTIS, PC A06/MF A01.

The papers in the volume define some important issues in hazard management that are emerging during our national reexamination of environmental policies. Authors have identified three principal themes that resonate throughout current public debate about technological hazards. Part 1 addresses the question of how to regulate hazards--those arising from chronic, low-level exposures and from high-consequence hazards. Part 2 presents articles in hazards equity, compensation, hazardous waste facility siting and hazard compensation. Part 3 presents a set of practical lessons and cautions about managing hazardous technologies.

47776 **(PB—86-203056/XAB) Report to congress on injection of hazardous waste.** Salazar, M.; Kardon, G. (Environmental Protection Agency, Washington, DC (USA). Office of Drinking Water). May 1985. 286p. NTIS, PC A13/MF A01.

In response to a directive from Congress, expressed in Section 701 of the Hazardous and Solid Waste Amendments of 1984, EPA obtained information on the engineering, hydrological, regulatory, and waste characteristics of hazardous-waste injection wells. Some of the general characteristics found were: There were 252 wells in 112 facilities of which 195 in 90 facilities were active in 1984; The injected volume of 181 wells which were active in 1983 was estimated at 11.5 billion gallons. Most of the injection occurs in the Gulf Coast and the Great Lakes Area.

47777 **Trends in environmental protection legislation in the USA and consequences for power plant design.** Dooley, B.; Baruch, S.B.; Miller, M.J. (Electric Power Research Inst., Palo Alto, CA, USA). **66**: No. 5, 477-481(May 1986). (In German).

Environmental protection legislation in the USA has had far-reaching effects on the design and operation of foesil fuel-fired power stations. During the 1960s investigations specific to different elements have been undertaken into air, water and material independently of each other. With the formation of the Environmental Protection Agency in 1970 a long process of integration of the environmental protection laws on the one hand and of their implementation in power station construction on the other hand commenced. This trend has continued in the 1980s and the reduction of emissions of toxic substances forms an essential component of the consolidation of the environmental protection legislation. This paper describes the consequences of this progressive development and its effects on the design and operation of power stations in the future.

2904 Natural Resources

REFER ALSO TO CITATION(S) 47771

2905 Research, Development, Demonstration, And Commercialization

REFER ALSO TO CITATION(S) 47784

47778 **(INIS-mf—10138) [Iraqi Atomic Energy Commission]. Annual report 1982-1983.** (Iraq Atomic Energy Commission, Baghdad). 1983. 140p. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703223.

Since the publication of the 1981 annual report by the Iraqi Atomic Energy Commission (IAEC) significant progress has been made in various areas of the peaceful applications of atomic energy in Iraq. One of the major activities of the IAEC is the medical utili-

zation of radioisotopes which include therapeutic applications in the fields of radiotherapy and oncology, diagnostic applications in nuclear medicine and other uses in medical research. At present, there are four nuclear medicine centres in Iraq. The largest two are situated in Baghdad and the other two are located in the southern and northern parts of the country. The major activities of these centres are reflected in this report. Other major activities of the IAEC are represented by the Nuclear Research Centre (NRC). The NRC is concerned mainly with research on various applications of radioisotopes in agriculture, biology, chemistry, physics and health physics. The present annual report contains extended abstracts of research projects performed at the NRC during the years 1982-1983. The IAEC's endeavour to extend the peaceful applications of atomic energy in Iraq has been going on despite the Israeli act on 7th June, 1981 which destroyed the Tammuz research reactor. In this report, documents issued by international organizations condemning this action are included.

47779 **(INIS-mf—10404) [Australian Atomic Energy Commission Research Establishment]. 33rd annual report 1984-1985.** (Australian Atomic Energy Commission Research Establishment, Lucas Heights). 1986. 115p. NTIS (US Sales Only), PC A06/MF A01. File Number DE86703222.

The Commission's program has three components: research and development, commercial operations, and service infrastructure. Applied research and development emphasises environmental science, waste management, medical applications of radioisotopes and radiation, industrial applications and nuclear technology. The Commission supports a production program for radioisotopes and radiation services. Scientific services include computing, instrumentation, materials fabrication and examination, environmental survey and the handling of highly radioactive materials.

47780 **(NIRS—22) Annual report of National Institute of Radiological Sciences, April, 1982-March, 1983.** (National Inst. of Radiological Sciences, Chiba (Japan)). Oct 1983. 100p. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703224.

This report gives the information on the investigation conducted by the scientific staffs of the Institute during this period. The total budget of the NIRS for fiscal year 1982 was 5.85 billion yen, 800 million yen more than that for the previous year. Several new and important projects as well as the existing commitments were carried out by the prudent allocation of the budget. Three long term research projects were carried out, that is, exposure to the environment radiation due to nuclear power generation, estimation of the risk due to low level radiation exposure, and medial application of particle accelerators, in addition to basic research. The former two projects were completed by the end of fiscal year 1982. A research on the biological effect of tritium began as a new project for five years at the beginning of fiscal year 1982. As this year was the silver jubilee of the Institute, the commemorative meeting was held in October, 1982. The gists of 11 reports related to physics, 6 reports related to chemistry, 8 reports related to biochemistry and biophysics, 11 reports related to cell biology, 6 reports related to immunology and hematology, 12 reports related to pathology, 9 reports related to genetics, 7 reports related to clinical science and 18 reports related to environmental science are collected.

47781 **(NIRS—23) Annual report of National Institute of Radiological Sciences, April, 1983-March, 1984.** (National Inst. of Radiological Sciences, Chiba (Japan)). Oct 1984. 106p. NTIS (US Sales Only), PC A06/MF A01. File Number DE86703225.

This report gives the information on the investigations conducted by the scientific staffs of the institute during this period. The total budget of the NIRS for fiscal year 1983 was about 5.835 billion yen, 15 million yen less than that for the previous year. Some new and important projects as well as the existing commitments were carried out by the prudent allocation of the budget. Four long term research projects were carried out, that is, research on the biological effect of tritium, medical application of particle accelerators, studies on the stochastic effect of irradiation and its risk estimation, and assessment of the exposure to environmental radiation of men, in addition to basic research. The second project was completed in fiscal year 1983, and the latter two projects began as five-year projects. The gists of 9 reports related to physics, 6 reports related to chemistry, 8 reports related to biochemistry and biophysics, 8 reports related to cell biology, 10 reports related to immunology and hematology, 10 reports related to physiology and pathology, 11 reports related to genetics, 10 reports related to clinical science, and 19 reports related to environmental science are collected.

2906 Nuclear Energy

REFER ALSO TO CITATION(S) 47321, 47322, 47504, 47509, 47650, 47743, 47745, 48788, 48790

47782 **(DOE/EIA—0473(85)) Nuclear Power Plant Construction Activity, 1985.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). 13 Aug 1986. 61p. NTIS, PC A04/MF A01; 1 - GPO; GPO Dep. File Number DE86014787.

Nuclear Power Plant Construction Activity 1985 presents cost estimates, chronological data on construction progress, and the physical characteristics of nuclear units in commercial operation and units in the construction pipeline as of December 31, 1985. This Report, which is updated annually, was prepared to respond to the numerous requests received by the Energy Information Administration for the data collected on Form EIA-254, "Semiannual Report on Status of Reactor Construction."

47783 **(SAAS—338) Nuclear energy - overview of development trends. Summary report of a paper presented by Leonard Konstantinov.** (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). 1985. 33p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703226.

Presented at the SAAS on 17 October 1985.

Proceeding from the organizational structure of the IAEA selected activities of the IAEA in connection with power reactor safety are dealt with. Based on the IAEA's computerized Power Reactor Information System (PRIS) a survey is presented of the most recent statistical data concerning status and trends of nuclear power plant development throughout the world. The central role of the IAEA in assisting Member States in the utilization of nuclear energy for peaceful purposes is underscored. Finally, a brief account of the state-of-the-art of the USSR's nuclear power programme is given.

47784 **Nuclear technology transfer via standards: the OMB Circular A-119 in action.** Zapp, F.C. (Oak Ridge National Lab., TN). **14**: No. 2, 53-55(Feb 1986).

The Performance Assurance Project Office (PAPO) has 23 nuclear energy (NE) standards in some phase of conversion to the national consensus standards, and identified three new NE standards for possible converaion. The author describes the methods of developing a consensus for standards through the use of working groups and ballots and the process of adopting a standard. Voluntary NE standards categories cover operation, instrumentation and controls, equipment, programs and procedures, materials, electrical, and structures and building. 4 references, 2 tables.

47785 **Review of The Nuclear Connection.** Ball, S.J. (Oak Ridge National Lab., TN). **27**: No. 1, 13-14(Jan-Mar 1986).

2908 Waste Heat Utilization

47786 **(DOE/ET—11448-T1) External combustion steam injected gas turbine for cogeneration.** Norris, P.; Ford, D.; Meher-Homji, C.; Dixon, A. (Boyce Engineering International, Inc., Houston, TX (USA)). Jan 1980. 200p. NTIS $16.50.

A computer simulation of a Texaco entrained-bed coal-gasifier-fueled advanced (2400°F) gas turbine and heat-recovery steam turbine combined-cycle design analyzed the alternative control

strategies during load-following maneuvers. Boyce Engineering studied the transient operation of this gasification/combined-cycle (GCC) plant to determine open-loop response as a stand-alone plant, as well as closed-loop response while functioning in a large interconnected utility network during specified operating contingencies. A cold-gas clean-up train with a Selexol physical absorption system removed up to 90% of the H_2S in the raw fuel gas produced from high-sulfur Illinois coal. Control was satisfactory in either gasifier-lead or turbine-lead mode. Supplemental fuel-gas storage was not required, but GCC plant fuel-gas pressure control to minimize pressure transients at the absorber column is recommended. In simulations, the GCC plant responded well and local controllers adequately maintained the GCC plant operation during typical variations in electric power demand and every emergency upset.

2910 Conservation

REFER ALSO TO CITATION(S) 47815, 47816, 47833, 47834, 47835, 47836, 47838, 47839, 47840, 47841, 47842, 47843, 47844, 47845, 47846, 47847, 47848, 47849, 47850, 47851, 47852, 47853

47787 (CONF-8508111—Vol.1, pp 15-23) **Practical care and feeding of evaluation.** Dethman, L.; Spinney, P. (Washington State Energy Office, Olympia). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Over the past year and a half, the Washington State Energy Office (WSEO) has progressed from no systematic evaluation efforts and a negative view of evaluation, to a three-member evaluation team whose services are in demand throughout the agency and whose products are used by program and agency management. The process has been swift and not without pitfalls. This paper (1) discusses the practical lessons learned thus far from designing and implementing the evaluation program, and (2) gives an overview of how the authors have developed, implemented, and used computerized tracking systems. A companion paper in these proceedings gives the particulars on the development of the tracking systems, from hardware selection to specific software applications.

47788 (CONF-8508111—Vol.1, pp 26-35) **Comparative evaluation of six different energy conservation programs serving low income households in Massachusetts.** Nadel, S.M.; Sherman, M. (Massachusetts Audubon Society, Lincoln). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Massachusetts Executive Office of Communities and Development, (MEOCD) and the Massachusetts Audubon Society (MAS) evaluated six energy conservation programs operated by MEOCD through 29 local agencies. The study isolated energy savings attributable to temporary and permanent materials, heating system cleaning and tuning, burner replacement, standard weatherization as funded by DOE and other sources, and weatherization enhanced with HUD Solar Bank funds. The study found high savings and benefit-cost ratios for burner replacements (17.9% savings), and for standard and enhanced weatherization programs (21.2% and 40.7%, respectively). Lesser savings and benefit-cost ratios were attributable to temporary materials (7.7% savings), permanent materials (7.2% savings), and heating system cleaning and tuning measures (0.9% savings. The study found that homes receiving burner replacements and/or sidewall insulation had above average energy savings. Observation data and available references suggest that heating system tuning and infiltration reduction programs need improvement. The study reinforces MEOCD's recent decision to raise the expenditure ceiling for standard weatherization, as investments beyond the old ceiling proved to be very cost effective. 23 references, 2 tables.

47789 (CONF-8508111—Vol.1, pp 36-44) **Evaluation of Wisconsin's Low-Income Weatherization Program.** Hewitt, D.C. (Wisconsin Energy Conservation Corp., Madison). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

A detailed evaluation was conducted of the Low-Income Weatherization Program operated by the Wisconsin Department of Health and Social Services. The purpose of this study was to: (1) develop recommendations for improving the administration of the DH and SS program; (2) establish guidelines for choosing the best weatherization strategy; and (3) measure energy savings in the DH and SS program, and identify characteristics associated with differences in savings levels. The report documented weatherization work completed and energy usage for 418 houses weatherized in 1982 and a 91-house control group. Overall heating energy savings, determined by using the Princeton Scorekeeping Method (PRISM), were on the order of 6% to 10%, or 80 to 130 therms a year. Typical investments were about $700 per house for materials, with total costs of about $2250 including materials, labor, program support and administration. About 70-75% of the occupants felt the program did a good job in weatherizing their homes. Field visits to 98 houses indicated a need for improved selection and application of weatherization measures. 2 figures, 1 table.

47790 (CONF-8508111—Vol.1, pp 45-54) **Evaluating weatherization options: a comparison of three service alternatives.** Kushler, M.G.; Witte, P.M. (Michigan Dept. of Commerce, Lansing). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper presents the highlight results of a comprehensive study of alternative approaches to providing low-income home weatherization services in Michigan. Four distinct levels of weatherization service were examined: (1) the regular federal Low-Income Home Weatherization Assistance Program (WAP); (2) a reduced cost version of the regular program, focusing only on providing ceiling insulation of R-19, infiltration work, and water heater insulation; (3) a low-cost/no-cost program using local volunteers; and (4) a comparison group of low-income households not receiving weatherization services. Over 650 homes from throughout the state were involved in the study, which was conducted during 1983 and 1984 (using the winter of 1983/84 as the post-service heating season). The major results of the study are those pertaining to fuel savings. Homes in the regular group achieved a 14.7% gross reduction in space heat fuel use (weather adjusted), while those in the reduced-cost group achieved a 9.2% reduction. Homes receiving the low-cost/no-cost service demonstrated no significant change in space heat fuel use, while the no-service comparison group actually increased its consumption by 5.7% over the time period examined. 5 references, 5 tables.

47791 (CONF-8508111—Vol.1, pp 72-82) **Evaluation of a financial incentive program: the BPA Residential Weatherization Program.** Hirst, E.; Goeltz, R.; Keating, K. (Oak Ridge National Lab., TN). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

During 1982 and 1983, the Bonneville Power Administration (BPA) operated an interim Residential Weatherization Program (RWP) throughout the Pacific Northwest. Participating households received free home energy audits and financial assistance to help pay for installation of retrofit measures in their homes. Almost 104 thousand homes were retrofit during the two years that the program operated; BPA's program cost totaled almost $160 million. This paper summarizes the results of a comprehensive evaluation of the BPA program. The evaluation focused on the energy-saving effects of the program and on its economic costs and benefits. 11 references, 3 figures, 3 tables.

47792 (CONF-8508111—Vol.1, pp 83-92) **Tale of two programs: an application of the Princeton Scorekeeping Method to evaluate energy savings of two weatherization programs.** Airriess, E.; Newman, P.; Banerjee, A.; Goldberg, M. (Public Service Commission of Wisconsin, Madison). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper compares the energy savings resulting from two low-income weatherization programs in the state of Wisconsin. One program uses prescriptive guidelines for the type of measures to be installed; the other requires that all measures meet a simple five year payback. Each program's energy savings were evaluated with the Princeton Scorekeeping Method in 1984 and 1985 to guide decisions in qualitative improvements to state weatherization efforts. The methodology and design employed in this study offer lessons to other energy conservation evaluators. 6 references, 7 tables.

47793 (CONF-8508111—Vol.1, pp 110-119) **Measuring conservation cost-effectiveness: a utility perspective.** Fox, E.W.; Kelly-Cochrane, D.R. (San Diego Gas and Electric Co., CA). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

California Utilities, the California Energy Commission (CEC), and the California Public Utilities Commission (CPUC) have devoted significant resources to develop an appropriate methodology for evaluating conservation and load management programs. A major milestone of this effort resulted in the Joint CEC/CPUC Standard Practice for Cost-Benefit Analysis of Conservation and Load Management Programs (CEC/CPUC, 1983). While the Standard Practice gave utilities a common methodological framework for measuring program impacts, it left many related issues unresolved. These issues include the appropriate evaluation perspective (e.g. the non participant vs. society), measuring program-induced energy savings, and valuing the external and intangible conservation/load management effects. This article first outlines the Standard Practice, and then discusses how San Diego Gas and Electric Company (SDG and E) has worked to resolve the significant cost-effectiveness issues with the Standard Practice framework. 5 references, 1 figure, 3 tables.

47794 (CONF-8508111—Vol.1, pp 120-129) **Creating supply through demand side programs: the Austin experience.** Dahlke, D. (City of Austin Resource Management Dept., TX). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The City of Austin established a 15 year goal of 553 MW of conservation and alternative generation energy supply in 1983. This paper discusses the planning and evaluation tools developed to integrate Austin's conservation and load management strategies into traditional supply-side utility planning processes. Those tools include: data bases on program participants; computerized planning and forecasting models; building energy analysis programs; and end-use metered program savings. For conservation and load management programs to be integrated into utility load forecasting and generation planning processes, they must undergo rigorous and sophisticated planning evaluation processes. Austin's programs have a 3 year track record with evaluations and energy savings analyses showing 31 MW of conservation generated supply. The results and projected savings of these programs were integrated into the Austin Electric Utility's forecast for the first time in 1985. 4 tables.

47795 (CONF-8508111—Vol.1, pp 130-139) **Evaluation procedures as part of program planning.** Clingerman, R.J.; Clements, A.M. (Houston Lighting and Power Co., TX). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Utility-sponsored programs in the past were primarily marketing efforts. Levels of participation provided an accurate measure of their success. However, after the emergence of energy conservation programs, volume of participation alone was no longer a reliable indicator of success. Conservation programs encounter many conflicting forces. Using less of a product often requires a conscientious, sustained effort. Extraneous influences such as weather, pricing, etc. also mask the performance of these programs. Thus, many early attempts at evaluating conservation programs were based on little more than best guesses hidden behind that friendly but overworked facade - the engineering estimate. Accurately evaluating a myriad of conservation programs, each with specific goals, requires an integration of evaluation procedures into the planning phase of a project. This paper presents a method in which evaluation procedures evolve as a natural consequence of planning. 2 figures, 4 tables.

47796 (CONF-8508111—Vol.1, pp 148-154) **Lessons from a local government technical assistance program.** Dethman, L.F. (Washington State Energy Office, Olympia). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Local Government Technical Assistance (LGTA) Program assists local governments, Indian tribes, and special districts in identifying cost effective projects that save or produce energy, and helps them to overcome obstacles in implementing those projects. The Washington State Energy Office (WSEO) has operated the program since May 1982; it is jointly funded by the Bonneville Power Administration and the Department of Energy. Participants are selected in two rounds each year. To evaluate program success from the point of view of those served, representatives of 32 communities selected in Riybds 1, 2, and 3 (between July 1982 and August 1983) were interviewed by telephone during August 1984. Two other communities were not surveyed because they participated minimally in the program. Since most of the communities are still pursuing their LGTA projects, final energy savings outcomes of LGTA assistance cannot be determined. This study, then combines aspects of both process and outcome evaluation. Survey findings are the major source of program evaluation information, but review of program materials and discussion with program managers and staff allowed a fuller interpretation of findings and more practical recommendations.

47797 (CONF-8508111—Vol.1, pp 155-158) **Using soft data to supplement cost-benefit evaluations.** Densmore, B. (Center for Neighborhood Technology, Chicago, IL). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

In CNT's case, the survey results underscore the fact that institutional clients apparently value the program's role in bringing attention to facilities management issues. It may be that the consulting expertise and role modeling vis a vis any construction project is of special value to nonprofits because their staff generally lack experience in this area. Although energy savings is the first priority, it is clear that this side effect is an attraction to clients. It is also clear that CNT must either do a better job of selling those services that received a relatively low ranking or reduce the level of effort (and cost) now associated with them. An energy conservation program is a product which is sold to clients as a way to reduce (or avoid-increases in) energy costs. If/when energy costs stabilize, the incentives for participating in such programs decreases. Program managers thus need to become increasingly adept at targeting customer concerns and priorities. Programs that require too much in the way of technical expertise or initiative from clients are especially vulnerable to the disappearance of their market.

47798 (CONF-8508111—Vol.1, pp 160-169) **Timely evaluations: a method for undertaking and evaluating an energy conservation program in under one year.** Nadel, S.; Meyer, P. (Massachusetts Audubon Society, Lincoln). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Massachusetts Audubon Society (MAS) developed and tested a new method for measuring the energy savings attributable to specific energy conservation programs. With the MAS method, an evaluation can be completed in as little as three months. The method is well suited for monitoring oil-heated buildings. However, the method is not suited for monitoring programs where the quantity or quality of the weatherization work is likely to be influenced by the presence of monitoring instruments. The MAS method makes use of direct meter measurements of oil and gas consumption and on-site indoor/outdoor temperature differences. Weekly energy

consumption and temperature data are recorded for four weeks before, and four weeks after weatherization. The data are analyzed using an analysis of variance statistical procedure. The application of the MAS method (and some variations on the method) to an evaluation of Massachusetts' low-income weatherization programs is discussed. Comparison of the MAS study to evaluation studies done with the Princeton Scorekeeping Method (PRISM) show the MAS method to be of comparable accuracy. 11 references, 3 tables.

47799 (CONF-8508111—Vol.1, pp 170-179) **Data quality considerations in using the PRISM program.** Dunsworth, T.S.; Hewett, M.J. (Minneapolis Energy Office, MN). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Princeton University PRISM program represents the current state of the art in computerized analysis of residential energy use data. It has been found to be quite user-friendly and to normally produce realistic and robust estimates, but the testing and production experience also shows that its results can be quite erroneous if insufficient attention is given to several crucial data quality issues. Each data set should ideally contain 12 monthly readings of gas or electric use over one heating season, though each of these standards can be relaxed somewhat. The authors used 10 to 16 months with few problems, but with periods of 8 to 9 months it becomes critical to have summer baseload use and midwinter peak use both represented for reliable results. Following analysis they further eliminated cases with regression R^2 under 95%, CV of NAC over 5%, undefined or extreme parameter standard errors, or certain typical parameter deviations (eg. reference temperature beyond the 50-70°F range or baseload near or below zero for a combined use account that should have a positive value). These standards can be modified for differences in reading frequency, heating fuel, geographic/climatic area, sample size, and intended use of the analysis. 7 references, 3 figures, 1 table.

47800 (CONF-8508111—Vol.1, pp 182-189) **Evaluation of the Massachusetts Energy Conservation Service.** Nichols, D. (Energy Systems Research Group, Boston, MA). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

In 1984 an evaluation of the Massachusetts residential conservation service program was conducted for the lead RCS agency, the Executive Office of Energy Resources. The EOER expected the evaluation to answer the following questions: What are the strengths and weaknesses of the present program and how can EOER develop additional RCS program elements to overcome the motivational and resource obstacles to greater penetration of conservation measures? The technical evaluation of the existing program included review of the audit instrument, participation in home energy audits, and extensive interviews with a panel of resource persons, including representatives of: (1) program managers for RCS program operators; (b) community groups in each service area; (c) professionals active in the field of auditing and conservation measure installations; (d) utilities, fuel dealers; and (e) financial institutions. The evaluation of feasible opportunities for program enhancement included reviews of customer surveys, extensive interviews with the panel of resource persons, and development of systematic information on the nature and results of a set of utility and community residential energy conservation programs.

47801 (CONF-8508111—Vol.1, pp 201-210) **Effects of a municipal energy audit program on electricity consumption in single-family residences.** Brambley, M.R.; Bard, J.S.; Dalemar, B.A.; Johns, M.C. (Washington Univ., St. Louis, MO). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

An evaluation of the effectiveness during the cooling season of the residential energy audit program of a small municipality in Missouri is summarized. Impacts of the program on both electricity consumption and conservation activity are statistically estimated by comparing appropriate quantities for treated test and untreated control groups. The study is used as an example of how such an evaluation may be done. Some of the problems encountered both in carrying out the evaluation and in interpreting the results are presented, and selected solutions and their significance are discussed. 5 references, 3 tables.

47802 (CONF-8508111—Vol.1, pp 211-219) **Evaluation consideration: confounding variables.** DiPasquale, J.S. (Missouri Dept. of Natural Resources, Jefferson City). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Missouri Division of Energy is currently engaged in an ongoing evaluation of one aspect of its Residential Conservation Service (RCS) Program. This paper briefly explains the purpose and methodology of the study, and then focuses on intervening variables that had to be considered to make the study a valid one. The manner in which the evaluation team dealt with each of several constraints is discussed.

47803 (CONF-8508111—Vol.1, pp 233-249) **Evaluating potential employment effects of community energy programs.** Tschanz, J.F. (Argonne National Lab., IL). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Through conservation and the use of locally available resources, an energy management program would reduce the drain on the local economy because of imported fuels and would benefit from the dollars retained locally in increased economic activity and employment. This paper examines the estimates, made by five communities during energy planning projects, of dollars retained locally and potential employment effects. Each community included a variety of energy management options within its project, ranging from simple, inexpensive retrofit improvements in individual structures to technologically sophisticated community energy supply systems. Comparisons of the aggregate results show wide variations among the five communities. Some of these differences may be real and attributable to specific differences in local conditions and proposed programs. Other differences, however, arise from the various methods and assumptions used by the communities in making their calculations. This paper interprets the results of these community evaluations by comparing the methods and assumptions they applied. 15 references, 6 tables.

47804 (CONF-8508111—Vol.2, pp 13-22) **Use of non-participant evaluation to enhance program design.** Peters, J.S.; Bronfman, B.H. (Evaluation Research Corp., Portland, OR). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper discusses the evaluation of a Request for Proposals (RFP) solicitation process for a third-party financing program developed by the Bonneville Power Administration. The evaluation technique involved discussions with nonresponding RFR recipients. Results of these discussions showed that only 24% of the requesters actually considered responding once they received the RFP. This resulted in an adjusted response rate for the solicitation of 8%. Additionally, these discussions resulted in useful information regarding program modifications and clarification of market segmentation of commercial energy service providers. 5 references, 2 figures, 3 tables.

47805 (CONF-8508111—Vol.2, pp 84-94) **Comparing evaluation requirements among institutional conservation programs.** Gray, L.J.; Royal, G. (Meridian Corp., Falls Church, VA). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The development of new options for institutional energy conservation programs requires the definition of new evaluation criteria. Differences among evaluation criteria most frequently exist due to the technical and administrative mechanisms that are unique to each program. However, a common goal shared by the programs is the achievement of energy savings, and therefore, an evaluation objective is to determine success of these programs in meet-

ing those goals. With the development of various institutional energy conservation options, there is a critical need to compare evaluation criteria among program options that will allow program managers to assess program effectiveness. In order to be useful, energy conservation evaluation criteria need to be adapted to meet the needs of new directions. Criteria can include common criteria (e.g., energy savings, incentive levels, costs, or penetration rates) and distinct criteria (e.g., energy savings, incentive levels, costs, or penetration rates) and distinct criteria measuring how well the program's goals are being met. This paper summarizes significant new directions for institutional conservation and their key evaluation requirements. In addition, common evaluation criteria among program options are identified and discussed. Distinct criteria that are specific to each program option are examined in order to highlight their relative importance in measuring program accomplishments. 7 references, 2 figures.

47806 (CONF-8508111—Vol.2, pp 95-101) **Building evaluation into operating programs.** Allen, R. (Dept. of Energy, Boston, MA). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper highlights some of the data problems being experienced by state energy office program operators (users) in carrying out their energy programs. It attempts to identify the minimum data collection requirements needed by the program operators to demonstrate that the program goals were either achieved or not. 12 references.

47807 (CONF-8508111—Vol.2, pp 120-128) **Software in the evaluation context: choosing and using the right tools.** Spinney, P.; Dethman, L. (Washington State Energy Office, Olympia). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Evaluation Team has been a formal part of the Washington State Energy Office for approximately one year. Among other things, the team is responsible for monitoring and evaluating each of the conservation and energy resources development programs administered by the agency. This responsibility involves setting up data collection systems, conducting and analyzing surveys, performing economic analyses, putting together final evaluation reports, and working with program staff and agency management to integrate evaluation needs and results in relevant decision-making forums. In trying to meet the challenges posed by these responsibilities, the authors have made increasing use of microcomputers and the commercial software available for them. While computers are proving to be an invaluable resource for the evaluation team, their use brings forth a host of complicated issues. This paper discusses software selection, application development, support, and maintenance within the context of each of the major computer uses: data tracking, survey analysis, economic analysis, and the incorporation of results into final evaluation reports. Several specific software packages are described. 2 tables.

47808 (CONF-8508111—Vol.2, pp 152-161) **Pennsylvania Energy Center performance evaluation.** Snyder, E.T. II; Martin, J.L. (Governor's Energy Council, Harrisburg, PA). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Many public officials are calling for performance standards such as merit pay for public employees and teachers. This concides with demands for public sector programs to have clear and definable performance standards. These standards are designed to act as the public-sector equivalents to the private sector market test. In 1981, the Governor's Energy Council (GEC) developed performance standards that emphasize cost effectiveness and energy savings for its principal contractors: the Pennsylvania Energy Centers (PECs). This performance-based evaluation allows the GEC to make rational programmatic and funding choices as it pertains to the PECs. Furthermore, it acts as a financial incentive by rewarding those PECs that excel in meeting the standards. 3 figures.

47809 (CONF-8508111—Vol.2, pp 174-183) **Measuring the contributions of Austin's Conservation Power Plant.** Birnbaum, I. (City of Austin Electric Utility, TX). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The City of Austin Electric Utility is anticipating significant demand savings from conservation and load-management programs. The contributions of the programs, collectively known as the Conservation Power Plant, were factored into the Electric Utility's long range resource and generation forecasts. The scope of Austin's Conservation Power Plant requires that program evaluation play an integral role in the planning and implementation efforts. If the programs are to be factored into long-range forecasts, the utility must be able to count the demand savings with a level of confidence comparable to data available about generated or purchased capacity. However, there is very little utility experience in accurately measuring demand reduction and the impact of programs in cooling-dominated climates. In response to these challenges, Austin has developed a comprehensive strategy for evaluating the programs that comprise the Conservation Power Plant. The evaluation effort features extensive end-use metering to determine the programs' demand savings levels. 3 tables.

47810 (CONF-8508111—Vol.2, pp 207A-207K) **Cost-benefit analysis of utility sponsored energy conservation programs: an economic welfare perspective.** Weinstein, B.; Scott, B. (Bradley Univ., Peoria, IL). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper is concerned with identifying an appropriate cost-benefit methodology for evaluating utility sponsored energy conservation programs. This methodology is developed based upon an economic welfare model. This model provides a comprehensive and generally accepted basis for assessing the societal impacts of program and policy implementation. The different categories of market imperfections that provide the basis for implementation of utility sponsored programs are discussed. Based upon these analyses, a specific energy conservation program cost-benefit methodology is derived for use in evaluating second best energy conservation programs that compensate for imperfections in the pricing of electricity and natural gas. The paper indicates that, to the extent that information or capital market imperfections inhibit energy conservation investments, the implementation of first best programs that correct these imperfections in their market of origin provide an appropriate mechanism for encouraging socially optimum levels of energy conservation. 9 references.

47811 (CONF-8508111—Vol.2, pp 208-216) **Economic analysis and program evaluation.** Spinney, P. (Washington State Energy Office, Olympia). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Quantitative estimation and economic analysis of energy program impacts provides the program evaluator with powerful tools. Such analysis: (1) provides a benchmark against which to compare program efficiency and effectiveness; (2) encourages program planners and managers to take an analytical approach as to what factors determine program outcomes; (3) makes the opportunity costs of programs or program actions more explicit; (4) contributes to increased certainty in regional energy planning; and (5) provides systematic feedback as to how program performance changes over time. Quantitative and economic analysis can help convey to the policy maker the extent to which public resources are being employed efficiently and effectively. Judicious use of methods described in this paper can help ensure that decisions are made in a reasoned, objective smanner. These methods, however, can also hinder or bias decision making. Sinceuch methods result in numbers, it can be easy to lose sight of the process by which the numbers were obtained. Assumptions can also be manipulated, allowing bias to be hidden behind a mask of illusory objectivity. This is not to imply the existence of malfeasance. Most public programs, energy programs included, satisfy a number of sometimes conflicting objectives: cost-effectiveness is obviously not the only reason

these programs are implemented and continued. It is concluded that economic analysis is a valuable addition to the program evaluator's analytical took kit. It is, however, only one tool among several.

47812 (CONF-8508111—Vol.2, pp 284-293) **Taking the con out of conservation program evaluation.** Doane, M.J.; Hartman, R.S. (Analysis Group, Inc., Sausalito, CA). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

A crucial step in determining the cost-effectiveness of a utility conservation program is to measure the energy savings that can be directly attributable to the program. This paper describes the results of a project designed to develop and test alternative methods to estimate program induced savings. The alternative methods range in cost and complexity and in their ability to address important methodological concerns that arise during program evaluation. These concerns include the need to control for factors influencing consumption other than the program and the need to test for the presence of self-selection bias, a problem inherent in the evaluation of most voluntary programs. 9 references, 4 tables.

2920 Supply, Demand, And Forecasting

REFER ALSO TO CITATION(S) 47372

2930 Policy, Legislation, And Regulation

REFER ALSO TO CITATION(S) 47321, 47322, 47509, 47743, 47745, 47772, 47796, 47805, 47806, 47808

47813 **Management and planning of energy/environment systems in the United States of America.** House, P. (Office of Technology Impacts, Dept. of Energy, Washington, DC). pp 182-200 of National perspectives on management of energy/environment systems. Foell, W.K.; Hervey, L.A. New York, NY; John Wiley & Sons, Inc. (1983).

Energy planning in the United States is clearly polynucleated. Given the ubiquity of energy use and the federal approach to problem solving, each center of interest addresses energy issues and also tends to develop individual methods for dealing with questions of energy policy. This results in a large number of energy models with different aims and capabilities. However, this chapter is limited to the models used by the US Department of Energy (DOE) for official planning purposes. This restricts the number of models considered, but the fact that the DOE has only been in existence since 1 October 1977 and was made up of several previously existing units means that the "official" models of the Department are still evolving. Consequently, the discussion will be limited still further to those models that were the official models of some of the organizations which constitute the present Department; specifically, the Project Independence Energy Systems (PIES) model of the former Federal Energy Administration (FEA), the Brookhaven National Laboratory (BNL) Modeling System of Energy Research and Development Administration (ERDA), the Strategic Environmental Assessment System (SEAS) of the Office of Environment, ERDA, and the model developed by the Stanford Research Institute (SRI) as part of ERDA's Market Orientation Program Planning Strategy (MOPPS) exercise.

2940 Fossil Fuels

REFER ALSO TO CITATION(S) 47148, 47176, 47219, 47225

47814 **Arctic energy opportunities: Perspectives on U.S. resources and development.** Frye, K.N. (U.S. Dept. of Energy, Washington, DC 20585). pp 785-790 of Ocean engineering and the environment (Conference record). Piscataway, NJ; IEEE Service Center (1985). (CONF-8511102—).

From Ocean '85; San Diego, CA, USA (12 Nov 1985).

The Arctic is one of the last energy frontiers, yet one with the greatest of opportunities -- opportunities for massive new sources of energy, opportunities for imaginative technology, and opportunities for research cooperation. This paper presents the U.S. Department of Energy's (DOE) perspective on Arctic energy opportunities, the resources, development plans, and technical barriers. The paper outlines major U.S. policy areas and the Arctic programs of DOE and other U.S. agencies which are pursuing Arctic energy issues. Arctic energy development opportunities, particularly in the context of supportive research and cooperative efforts, are also discussed. These efforts, and enhanced international cooperation, may help solve Arctic development problems in a more efficient and timely way.

2950 Hydrogen And Synthetic Fuels

REFER ALSO TO CITATION(S) 47870

2960 Electric Power

REFER ALSO TO CITATION(S) 47793, 47794, 47795, 47801, 47804, 47810, 47823, 47833, 47836, 47838, 47842, 47843, 47845, 47846, 47851, 47853

47815 (CONF-8508111—Vol.2, pp 77-83) **Theoretical case study in utility planning and evaluation.** Bussiere, L.A.;. (City of Tallahassee, FL). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

A utility that relies on historical kWh and kW consumption trends to determine its utility services will consistently miss the mark and always be out of step with its customers. The utility's forecasts will indicate the need for new generating capacity years before such an addition is required. The design of innovative programs such as load management or time-of-day rates is severely hindered due to lack of information on customer appliances. In short, today's utility planning requires more than yesterday's utility bill. However, surveys to collect customer-specific data are time-consuming and costly. This paper presents a case study in which the municipal electric utility of the City of Tallahassee is in the process of modifying its audit program to collect customer data without a significant increase in costs or paperwork.

47816 (CONF-8508111—Vol.2, pp 217-226) **Calculation and application of the non-participant test within the cost-benefit analysis of utility load management programs in California.** Jacobson, M. (California Energy Commission, Sacramento). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Standard Practice for Cost-Benefit Analysis of Conservation and Load Management, developed by the staffs of the California Energy Commission and California Public Utilities Commission, was published in February, 1983, for use by all utilities and by both Commission staffs. The Standard Practice provides benefit cost ratio and net present value calculations from five perspectives: program participant, non-participant, all ratepayers, utility, and society. The Standard Practice offers consistent financial evaluation methods, but is silent on the issue of which of the five perspectives takes precedence for funding decisions. There has never been a formal statement on this issue for either Commission. The staffs of the two Commissions are re-evaluating the Standard Practice, and particularly the non-participant test, to determine if that test accurately reflects the impacts of utility programs on non-participants. Without resolution of several key policy issues surrounding the non-participant test, there will be continuing uncertainty in conservation and load management evaluation and funding. 4 references.

47817 **(DOE/BP—696) Bonneville Power Administration forecast of electricity consumption in the Pacific Northwest. Executive summary.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Power Forecasting). Jul 1985. 12p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014537.

This document presents a summary description of the Bonneville Power Administration 20-year forecast of electricity con-

sumption in the Pacific Northwest for the years 1986 to 2006. This is the fifth year BPA has prepared a long-range forecast for use in meeting the agency's internal planning needs. The forecast consists of high, medium and low case sceanrios. By developing a range of load projections, BPA is better able to reflect the uncertainty inherent in the forecasting process. As in previous years, the final medium projection has been produced by merging serparate results from BPA's long-term and midterm forecasts.

47818 **(DOE/EIA—0095(85)) Inventory of Power Plants in the United States, 1985.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). 8 Aug 1986. 295p. NTIS, PC A13/MF A01 - GPO; 1; GPO Dep. File Number DE86014788.

This document presents information about electric generating units operated by or planned to be operated by electric utilities in the United States and Puerto Rico. It presents statistics about electric generating units in operation by electric utilities, and a 10-year outlook of future generating unit additions by electric utilities, as of calendar year ended 1985.

47819 **(DOE/NBM—6014858) Electricity in economic growth.** (National Research Council, Washington, DC (USA). Committee on Electricity in Economic Growth). 1986. Contract W-7405-ENG-36. 184p. NTIS, PC A09/MF A01; GPO Dep. File Number DE86014858.

We address two fundamental relationships between electricity use and the economy in this report. One is how electricity use depends on various economic and technical factors, that is, the demand for electricity. The second is to what extent applications of electricity, as an especially high grade of energy, may facilitate technological advances and stimulate the economy through productivity gains. The committee's task was to assess the role of electricity in domestic economic growth. Our charge was to review the historical importance of electricity in US economic growth, analyzing structural economic changes that have or may take place and that could influence the future growth of electricity use and reviewing recent changes in electricity use with attention to their significance for the future.

47820 **(DOE/OR/00033—T202) Decision support for problems in which alternative actions affect downstream decisions, with an energy application.** Pumarada-O'Neill, L. (Northwestern Univ., Evanston, IL (USA)). Jun 1986. Contract AC05-76OR00033. 422p. NTIS, PC A18/MF A01; GPO Dep. File Number DE86014196.

Thesis.

Problems in which a present choice effects downstream decisions are usually solved informally or using decision analysis. Solving them requires considering the interactions of immediate alternatives with future decision-points. The hierarchical process proposed here is a formal approach which guides the decision-maker through a decision-structuring heuristic for solving multi-task problems. This process takes different forms for different problem structures, and according to which interacting decision-point was considered most important. The proposed methodology relies on pairwise analysis of sequential interactions. Although this process can be cumbersome in some contexts and it has a limited capacity for handling uncertain events, it is based on a methodology amenable to human decision-making and leads the decision-maker to a satisficing solution focused on the task considered most important. This thesis defines a general problem and focuses on a heretofore ignored subtype. After reviewing existing approaches to related types, it proposes a methodology for solving the featured problem. This methodology is evaluated, compared to related approaches, and applied to an electrical energy planning problem.

47821 **(EPRI-EL—4632-Vol.1) Integrated power system analysis package: scoping study. Volume 1. Industry survey. Final report.** Carlsen, K.; Fink, L.H. (Carlsen and Fink Associates, Inc., Fairfax, VA (USA)). Jul 1986. 132p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920425.

This project was undertaken to canvass the need for and the practicability of developing an integrated power system analysis capability that would accommodate existing widely used application programs, as well as new programs to be developed by EPRI and others, within an easy-to-use modular structure. The project included a mail survey of a large number of representative utilities, a series of follow-up on-site interviews with a selected sample of the respondents, and a study of the current state of the art in software integration within and beyond the electric power industry. The findings of this project are that integration of power system analysis software, properly defined, is indeed needed, that it is achievable within the present state of the art of software engineering, and that EPRI is an appropriate agent to undertake its development. The contemplated integrated capability will be modular, interactive, and evolutionary. It will be built upon an existing general purpose data base management system. It will include an initial core library of key applications programs. It will provide convenient and effective graphics and output analysis capabilities. It will enable the user to add to its library, at will and in a user-friendly manner, additional application programs of his own choice. It will be structured to permit implementation of expert systems techniques as they become practicable.

47822 **(EPRI-EL—4632-Vol.2) Integrated power system analysis package: scoping study. Volume 2. Software evaluation and integration. Final report.** Carlsen, K.; Fink, L.H. (Carlsen and Fink Associates, Inc., Fairfax, VA (USA)). Jul 1986. 87p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920426.

A survey of more than 50 utility representatives found agreement on the need for an integrated analysis capability and on EPRI as a logical organization to develop the first computer code package. The findings revealed no technical obstacles but indicated costs and the need to learn new programs could hinder implementation. This volume documents the assessment of available software and provides recommendations.

2980 Consumption And Utilization

47823 **(NP—6752542) Data on the development of the West German power electric industry in 1984.** (Bundesministerium fuer Wirtschaft, Bonn (Germany, F.R.)). Jul 1985. 67p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752542.

An introductory survey of international and national energy policies in 1984 as well as of the energy supply situation in the Federal Republic of Germany is followed by statistics, tables and diagrams containing significant data of energy economics. In particular, they refer to the primary energy balance, structure of energy consumption, import and export of energy supplies and the development on the hard coal, brown coal, mineral oil, electricity and gas market (reserves, application, prices). The year under review, 1984, is related to and compared with previous years reaching back as far as 1970.

30 DIRECT ENERGY CONVERSION

3001 Mhd Generators

REFER ALSO TO CITATION(S) 49101

47824 **(CONF-860663—1) Thermal radiation in MHD design applications.** Wang, C.S.; Chow, L.S.H. (Argonne National Lab., IL (USA). Magnetohydrodynamics Program). 1986. Contract W-31-109-ENG-38. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014532.

From 24. symposium of engineering aspects of magnetohydrodynamics; Butte, MT, USA (24 Jun 1986).

The results of scale-up calculations on total gas emissivity from combustion gases containing carbon dioxide, water vapor, potassium atoms, and submicron-size slag particles are provided. A correlation equation to calculate total gas absorptivity and corrections to account for a gray surface are also presented. Measured data on the temperatures and emissivities of a surface covered with seed-slag are also included. A significant effect of potassium atoms

and slag particles on total gas emissivity (especially at higher temperatures) is concluded. These calculated data, based on partially validated theoretical models, are approximate for MHD design applications and are presented in a form suitable for use by a design engineer. 14 refs., 8 figs., 1 tab.

47825 (CONF-860663—3) **Effects of impinging particle-laden gas jets on the potential for burnout in an MHD radiant boiler.** Berry, G.F.; Wang, C.S.; Choi, U.S. (Argonne National Lab., IL (USA). Magnetohydrodynamics Program). [1986]. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014549.

From 24. symposium of engineering aspects of magnetohydrodynamics; Butte, MT, USA (24 Jun 1986).

The potential burnout of the backwall of the radiant boiler by a high temperature particle-laden impinging jet has been analyzed for both CFFF and retrofit sized MHD plants. The analysis indicates that the decay of gas velocity and temperature will be negligible as a result of the short distance between the diffuser outlet and the backwall. It is concluded that, based on the present CFFF and retrofit radiant boiler design, the backwall will be susceptible to burnout because of the high temperature of the gas entering the radiant boiler. This high diffuser exit gas temperature does not have sufficient distance to cool down before impinging on the backwall. If the particle loading is higher and/or the refractory melting temperature is lower than assumed, the potential burnout problem becomes even more severe. The formation of a slag layer on the refractory surface will mitigate the burnout problem if the slag layer can form in the region of high jet velocity. However, because of the molten form of the slag layer which may be easily blown away, this improvement could be small. 6 refs., 11 figs.

47826 (DOE/ID/01745—T10) **[Mountain States Energy Division, Inc.] Quarterly technical progress report, April 1-June 30, 1986.** (Mountain States Energy, Inc., Butte, MT (USA)). 1986. Contract AC07-78ID01745. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014379.

This technical progress report presents the tasks accomplished at the Component Development and Integration Facility during the third quarter of FY86. Areas of technical progress included: Coal system development; test bay modification; seed system development; channel power dissipation and distribution system development; independent test activities; coal-fired combustor (CFC) nozzle project; materials testing; combustion characterization measurement; CFC support; 1A channel refurbishment; and test operations and results. Power test train operations were reinitiated in May. Tests completed for the baseline conductivity/power test series and the MHD seed characterization test series are detailed in Table 1. Major test operation accomplishments included: (1) Generating peak power of 1.51 MWe, which represents the highest diagonal power generated with the CFC and equals the previous CFC Faraday peak power. (2) Successfully integrating 32 AVCO-supplied current control units into power train operations. (3) Injecting seed with coal into the CFC - part of the first objective of the MHD seed characterization test series. 7 figs., 1 tab.

3003 Thermoelectric Generators

REFER ALSO TO CITATION(S) 47523, 47561, 47906

47827 (CONF-860102—Summs., pp EC-4.1) **High temperature thermoelectric energy conversion.** Wood, C. (Jet Propulsion Lab., Pasadena, CA). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

Considerable advances were made in the late '50's and early early '60's in the theory and development of materials for high-temperature thermoelectric energy conversion. This early work culminated in a variety of materials, spanning a range of temperatures, with the product of the figure of merit, Z, and temperature, T, i.e., the dimensionless figure of merit, ZT, of the order of one. This experimental limitation appeared to be universal and led a number of investigators to explore the possibility that a $\overline{ZT}$ also represents a theoretical limitation. It was found not to be so.

47828 (CONF-860102—Summs., pp EC-6.1-EC-6.2) **Alkali metal thermoelectric conversion (AMTEC) technology status review.** Bamlstpm. C/{/. (California Institute of Technology, Pasadena). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The Alkali Metal Thermoelectric Converter (AMTEC) or sodium heat engine has been the subject of experimental and systems investigations to assess its potential and feasibility for several space and terrestrial power applications. AMTEC is a thermally regenerative electrochemical system operating between a high temperature reservoir at 900-1400K and a sodium condenser at 400-BOOK. Its operation is based on the sodium ion conductor beta-alumina solid electrolyte(BASE), where thermal to electric conversion efficiencies of 20-40% have been predicted for practical systems. Other AMTEC characteristics that make it attractive for space applications are compactness, light weight, no moving parts, modularity and long lifetime potential. This paper reviews AMTEC operating principles and technical challenges, reports on recent electrode research results, and summarizes the status of AMTEC device experiments at JPL and elsewhere. Also, updated projections for AMTEC space nuclear power system characteristics is presented.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

3201 Buildings

REFER ALSO TO CITATION(S) 47238, 47240, 47422, 47787, 47788, 47789, 47790, 47791, 47792, 47793, 47794, 47795, 47796, 47797, 47798, 47799, 47800, 47801, 47802, 47803, 47804, 47807, 47809, 47812, 47815

47829 (AERE-R—1723) **Crystallographic texture: experimental geometry and defocussing correction.** Sheldon, B.E. (UKAEA Atomic Energy Research Establishment, Harwell). Aug 1984. 34p. Issuing Activity.

X-ray measurements of crystallite orientation distributions (crystallographic texture) have been performed at Harwell since 1975, and the results obtained have been invoked in attempts to describe the anisotropic behavior of bulk materials. Most of the data have been produced for zirconium alloys wherein the hexagonal-close-packed (h.c.p.) lattice imposes constraints upon polycrystalline aggregates which lead to their anisotropy. The details of the technique used at Harwell have not been well publicized, hence this paper attempts to identify the salient parameters and compare them with those used by other workers. Although the method is basically sound, certain areas of doubt have been identified and recommendations made as to their resolution.

47830 (BMFT-FB-T—86-022) **Development and testing of a low cost screw compressor for the refrigerants R 12 and R 114. Final report.** Schroeder, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 115p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752554.

Within this research project fundamental investigations of the nonazeotropic refrigerant mixture R 12/R 114 in heat pumps were made. This includes also the possibility of capacity control by changing the concentration of the refrigerant mixture. The thermodynamic properties of the refrigerant mixture were determined by measurement and calculation, and a pressure enthalpy-diagram was established for this mixture. In addition, test arrangements were set up for measuring the miscibility, viscosity, density and pressure of the ternary mixtures of oil, R 12 and R 114. This thermophysical data were determined in an extensive program and a correlation was made with several equations; so it was possible to realize the influence of the refrigerant mixture on the behavior of the oil. Phase-equilibrium measurements were made in order to determine the influence of the oil on the phase properties of the refrigerant mixture R 12/R 114. As an expected result, a pressure drop as compared to the pure refrigerant mixture could be observed. Investigations were carried out in order to find an optimal rectifier column

and operating conditions for a heat pump system combined with a capacity control arrangement. It was shown that this alternative enables nearly loss-free capacity control for bigger heat pumps. With 62 refs., 26 tabs., 47 figs.

47831 **(BMFT-FB-T—86-028) Development of a dry separation process for the sorting of raw pumice into heat restraining building material. Final report.** Roethele, S. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 101p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752556.

The basic principles for the technical layout of dry separation processes for raw pumice had been worked out at the end of the research work. A prototype plant could be projected and realised for the investigation of its on-line performance as soon as the primary objective i.e. the scale-up process data and the experimental results of main process components was fulfilled. The dry separation process for the sorting of natural pumice into a heat restraining pumice fraction and the heavy stones fraction combines the two separation techniques screening and air classification. With this technique a production plant was designed, installed and put into production that due to a number of specially designed devices is working under very humide conditions. Using that technique a potential of resources for heat restraining building material can be prospected in the Neuwieder Becken that up until now was said to be of low grade and not worth being exploited or being exhausted in very short time. The applicability of that technique within the mineral processing industry is not limited to pumice but is under experimental investigation for its use with lava and it is under design for volcanic tuff and other heat restraining materials. With 17 refs., 4 tabs., 50 figs.

47832 **(CONF-860901—1) Development of a major center for roof research in the United States.** Courville, G.E.; Huntley, W.R. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008981.

From 10. CIB congress on advancing building technology; Washington, DC, USA (21 Sep 1986).

The United States Department of Energy (USDOE) is building a major roof research facility at Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, USA. The purpose of the facility will be to carry out research to enhance the thermal performance and durability of low-slope roof systems. The centerpiece of the facility will be an environmental chamber capable of testing up to 3.8 m square roof sections under conditions of temperature, humidity, rain, and uplift air pressures encountered throughout the United States. Other features of this facility will be apparatus for thermophysical and chemical bench testing and a strong mathematical modeling capability. The facility will be designated as a National Users Facility, that is, it will be available to researchers from industry, academia, and other government agencies on a priority basis. USDOE and ORNL will be assisted by an Industrial Review Panel in setting research priorities and arranging schedules. The Facility will be ready for use early in 1988. Facility design features and a preliminary schedule of experiments will be described in this paper.

47833 (CONF-8508111—Vol.1, pp 6-14) **Evaluating energy conservation regulations.** Shaffer, J.C. (Seattle City Light, WA). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

While electric utilities have been realizing energy savings through informational efforts, financial incentives, and regulations, evaluation of informational and subsidy programs has dominated published evaluation literature. Unfortunately, because of the unique characteristics of energy conservation regulations, evaluations of informational and subsidy programs may not be the best models for evaluations of regulatory programs. This study describes some of the special challenges encountered in evaluation of Seattle City Light's Residential Efficiency Standards. The discussion focuses on goals and objectives, data collection, measurement of electricity savings, and cost-effectiveness. Evaluation techniques and major findings from Seattle City Light's Residential Efficiency Standards: The First 18 Months are presented. 7 references, 3 tables.

47834 (CONF-8508111—Vol.1, pp 56-70) **PRISM: a standardized method for keeping score on energy saved in houses.** Fels, M.F. (Princeton Univ., NJ). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Princeton Scorekeeping Method, or PRISM, is a statistical procedure which uses available billing and weather data to produce accurate estimates of saved energy. Derived from simple physical principles, the method provides physical descriptors as well as a weather-normalized index of consumption for each house analyzed. The long-range objective is a standardized approach which is equally applicable to all fuels, and which can be used for a wide range of climates and building types. This report summarizes the scorekeeping methodology - its motivation, its current status, and needed areas of expansion. 6 references, 6 figures.

47835 (CONF-8508111—Vol.1, pp 93-107) **Real world application: field testing the value of house doctoring as an incremental conservation measure.** Engels, D.; Peach, H.G. 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

One-hundred and fifty before and after blower door tests and seventy-five house doctor applications were performed on a random sample of homes to test the incremental effect of house doctoring as a conservation measure in the Hood River Conservation Project. Current results provide perspective on characteristics of the Hood River housing stock indicative of infiltration, structural performance measures of air changes per hour (ACH), effective leakage area (ELA), and average annual consumption. Evidence on the effects of House Doctoring in Hood River is presented, as indicated by change in ACH, ELA, and KWH savings, accompanied by an assessment of the reliability of blower door measurement. Kilowatt hour savings are contrasted with five additional comparison groups in an experimental design. Household characteristics for homes that benefit the most and the least from this new retrofit procedure are profiled. 9 references, 5 figures, 3 tables.

47836 (CONF-8508111—Vol.1, pp 142-147) **Process evaluation and program design: two BPA residential weatherization programs.** Lerman, D.I.; Bronfman, B.H. (Evaluation Research Corp., Portland, OR). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Between January 1982 and September 1983 the Bonneville Power Administration (BPA) funded a retrofit weatherization program for electrically heated homes in the Pacific Northwest, the Interim Residential Weatherization Program. In the winter of 1983-84, Evaluation Research Corporation (ERC) conducted a process evaluation of the Interim Program in which a number of problems came to light: communication bottlenecks between the BPA conservation program manager, the BPA area offices and participating utilities; delays in reimbursing utilities for payments to weatherization installers; and a perceived lack of willingness on BPA's part to incorporate utility perspectives into program design and contract modifications. The Interim Program was followed in October of 1983 by the BPA Long-Term Residential Weatherization Program. In the summer of 1984, ERC conducted a process evaluation of the BPA Long Term Program in which it was revealed that many of the problems identified earlier in the evaluation of the Interim Program and by BPA staff had been rectified; utilities were not longer uniformly critical of BPA's motives or of its responses to questions about technical specifications or contract interpretations; the great mistrust stemming from BPA's financial audit of the Interim Program had subsided; and utilities felt their needs were being addressed by BPA in program modifications achieved via negotiation. 1 figure.

47837 (CONF-8508111—Vol.1, pp 190-200) **Evaluation of an RCS program alternative: the Santa Monica Energy-Fitness Program.** Egel, K. (City of Santa Monica, CA). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

From May 1984 through May 1985, the City of Santa Monica operated an innovative home energy audit program designed to test alternative approaches to the federally-mandated Residential Conservation Service (RCS) Program, the program under which virtually all major utility companies in the nation have offered their customers energy conservation audits and recommendations since the early 1980's. The Santa Monica effort, known as the Santa Monica Energy Fitness Program, used new techniques designed to increase participation in the RCS Program by utility customers, particularly target groups, such as senior citizens, low-income residents, and renters of multifamily housing, as well as improve the energy savings achieved by participants. Of particular importance were the use of a door-to-door canvas as the primary means of offering the program to Santa Monica residents and the completion of direct service home energy audit, which includes the actual on-site installation of energy saving devices in the participant's home. This paper provides a summary of the unique elements of the Energy Fitness Program's approach and presents the preliminary results of the evaluation performed to measure the Program's effectiveness, particularly in terms of participation and energy savings. 1 reference, 4 tables.

47838 (CONF-8508111—Vol.1, pp 222-232) **Residential energy-efficiency program for Burlington Electric Department: research and development of a program design.** Sachs, B.; Hamilton, B.; Walsh, R.W. (The Memphremagog Group, Newport, VT). 1985. NTIS, PC AA11/MF A01. File Number DE86011425.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper reports the results of an extensive review and analysis of evaluations of existing residential conservation programs for the purpose of recommending a program design to meet the needs of a small municipal electric utility. Based on the study, a proposal was developed for a comprehensive program consisting of four parts: (1) a 50% grant-50% loan program for building owners; (2) a free major weatherization program for low-income building owners; (3) a community-based education/low-cost measures installation program and (4) development of local building energy-performance standards. The project's significance to energy conservation program evaluation lies in its utilization of evaluations from a wide range of residential programs to develop recommendations specific to a particular community situation. 2 references, 1 table.

47839 (CONF-8508111—Vol.2, pp 4-12) **Evaluating the marketing phase of the Hennepin County Residential Shared Savings Demonstration Project.** Miller, R.D.; Hagen, R.R. (Hennepin County Office of Planning and Development, Minneapolis, MN). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

In the Hennepin County Residential Shared Savings Demonstration Project a potential customer receives a direct-mail solicitation regarding the program. If interested, they are asked to sign and return a card that informs the ESCo of their interest and authorizes the local utilities to provide information of the household's past energy and water consumption to the ESCo. Once these cards are received, data are obtained for natural gas, electrical, and water consumption. (Water is included because several of the improvements are designed to reduce water consumption.) A minimum of 24 months of prior and continuous occupancy and utility records for that period are required in order to qualify for potential participation. Following receipt of the data from the utilities, each and every resident expressing an interest in the program receives a free, no obligation audit from the ESCo. The audit is used by the energy service company to determine whether their package of improvements is appropriate for the dwelling and as the basis for their presentation of the shared savings option to the homeowner. Homeowners are requested to accompany the auditor during the examination of the dwelling. If accompanied, the auditor educates the homeowner in ways to reduce energy consumption by altering use habits and call attention to areas requiring specific improvements. 4 references, 1 table.

47840 (CONF-8508111—Vol.2, pp 23-29) **Effective residential energy conservation.** Smith, R.C. (Energy Education and Services of Minnesota, Inc., St. Paul). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The main issue this paper addresses is the need to move utility sponsored residential energy conservation programs away from a general information format to one emphasizing the actual implementation of energy conservation improvements - programs that take into account that barriers hindering homeowners from making their energy management decisions. The ancillary issue is the resulting impact this change will have on the evaluation of energy savings since it will foster a shift away from analysis of real, documented, energy-conservation improvements. This paper is divided into four sections. It begins by discussing the need for, and importance of, this proposed change. It then describes the firms energy-conservation program which incorporates this shift and shows, by concrete example, how these concepts have been effectively applied. This is followed by a section on evaluation techniques applicable to this type of energy conservation program. Finally, a brief summary highlights the key points. 4 references.

47841 (CONF-8508111—Vol.2, pp 32-38) **Residential conservation incentives: a review of loan impacts.** Berry, L. (Oak Ridge National Lab., TN). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Although incentive effects vary greatly from one program setting to another, it may be possible to set some rough boundaries on the magnitude of the effects, all else being equal, that they are likely to produce. The purpose of this paper is to review evidence on the magnitude of loan effects from a series of utility-sponsored home energy audit program impact evaluations. The studies reviewed in this paper produced estimates of loan impacts that vary from 20% to 300% more energy savings in loan programs than in audit only programs. Much of the difference in these estimates results from how well one controls for the effects of self selection, program setting, target population characteristics and levels of response to loan programs (about 50% of audited customers using loans), with all else being equal, a loan program will produce about twice the energy savings of an audit-only program. 10 references, 4 tables.

47842 (CONF-8508111—Vol.2, pp 52-61) **Dynamics effects of utility energy conservation programs: a residential retrofit program example.** Hirst, E.; Keating, K. (Oak Ridge National Lab., TN). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Bonneville Power Administration (BPA) operated a Residential Weatherization Pilot Program from 1980 through 1982. The program provided free home-energy audits to 7200 electrically heated homes in the Pacific Northwest and gave zero-interest loans to weatherize 4100 of these homes. The total cost of the program was almost $11 million. This paper estimates the energy saving effects of the BPA program. The data used include one year of preprogram and three years of postprogram electricity consumption records. The total annual electricity saving experienced by the households that received both an energy audit and a weatherization loan averaged 5300 kWh/year one year after participation, increased to 6000 kWh and 6500 kWh two and three years after participation. The net annual electricity savings that can be directly attributed to the BPA pilot program for these households averaged 4500 kWh (15% of preprogram use) one year after participation and declined to 4300 kWh two years and 4200 kWh three years after participation. 8 references, 4 figures, 2 tables.

47843 (CONF-8508111—Vol.2, pp 108-119) **Analysis of a cooling and heat pump rebate program.** Lowry, P.; Robertson, C. (City Water, Light and Power, Springfield, IL). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Appliance efficiency rebates are becoming a popular technique for utilities to induce consumers to choose higher energy efficiency heating and cooling equipment. This paper describes a utility heat pump and air condition rebate program and presents a microcomputer based technique for program evaluation. The computer evaluation described analyzes the effects of the rebate program on the utility's demand and energy sales. It also provides useful measurements of the cost effectiveness of the rebates. The paper furnishes examples of how the analysis is useful in program planning. It also suggests ways in which the evaluation results may be helpful to utility personnel who are not directly responsible for the rebate program, such as engineers or other technical staff and economic planning staff. Enough information is provided in the paper for the reader to develop a similar computer evaluation program for use with Lotus 1-2-3 other spreadsheet software. 4 figures.

47844 (CONF-8508111—Vol.2, pp 162-171) **Assessing the training and technical-assistance needs of weatherization program subgrantees: a practical methodology which yields policy-maker-useful data.** Kinney, L.F. (Synertech Systems Corp., Syracuse, NY). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

A unique technique for sampling public opinion on matters of public concern was modified for use as part of an instrument to assess the training and technical assistance needs of subgrantees of the DOE-sponsored Weatherization Assistance Program. The instrument was successfully employed in a recently-completed T and TA Needs Assessment in Federal Region II. Since the methodology yields directly quantifiable data that ranks respondees' opinions according to a wide range of variables - yet has such pragmatic constraints as limited budget built in - it appears to have strong potential not only in assessing the T and TA needs of subgrantees of the Weatherization Program, but also in a variety of other planning and assessment functions within DOE. 2 references, 2 tables.

47845 (CONF-8508111—Vol.2, pp 184-194) **Hourly impacts of residential weatherization - the shape of things to come.** Warwick, W.M. (Bonneville Power Administration, Portland, OR). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Bonneville Power Administration (BPA), a Federal power marketing agency, has both a legislative mandate and an economic incentive to meet the future power needs of its customers with low cost conservation rather than higher cost conventional generation. In the power planning process, conventional-generation plants are evaluated according to specific criteria that are not directly applicable to conservation as an alternative power resource. These include the availability of a given amount of power at various times of the day or year. The focus of the research described in this paper was to develop estimates of the hourly impacts of residential weatherization on consumer energy use in order to derive estimates of the potential amount of conservation available at different hours of the day and year. Results of the research indicate that traditional physical models of energy use for residential heating significantly understate the importance of structural and occupant characteristics. These structural and occupant characteristics are important determinants of the effectiveness of weatherization on changes in the timing, as well as the amount of energy used for residential heating. 4 figures.

47846 (CONF-8508111—Vol.2, pp 195-204) **Assessment of the potential and actual load benefits of SDG and E's residential air conditioner cycling program.** Sebold, F.D.; Davis, C.E.; Fox, E.W. (Regional Economic Research, San Diego, CA). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

This paper describes the evaluation of San Diego Gas and Electric Company's residential air conditioner cycling program. The purpose of the study was to assess the program's load benefits. The analysis centered on the hourly electricity consumption patterns of a group of experimental participants. 1 figure, 2 tables.

47847 (CONF-8508111—Vol.2, pp 228-237) **Application of end-use disaggregation models to energy audit program evaluation.** Odinak, M.E.; Nelson, H. (XENERGY Inc., Burlington, MA). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

A pilot study was conducted to determine the value of end-use disaggregation models to energy audit program evaluation. The sites studied were 68 households audited by the Mass-Save, Inc. Residential Conservation Services (RCS) program, plus 68 control sites. The information was passed through an end-use disaggregation model to produce measures of energy consumption normalized for weather conditions and structural/life-style differences. That is, the disaggregation model affected control for factors that could affect energy consumption. The outcome was a tentative finding that the RCS program substantially reduces energy usage, the qualification being due to too few cases. The primary conclusion was that end-use disaggregation offers a route to effective energy audit program evaluation, with considerable increase in accuracy and/or substantial economies. End-use disaggregation is the allocation of observed fuel consumption to an inventory of energy consuming appliances, yielding estimates of kwH or CCF used by each appliance. For this study, end-use disaggregation was accomplished using XENERGY Inc. proprietary software, RECAP: Residential Energy Consumption Program. RECAP allocates energy according to engineering data and statistical characteristics of typical properties. 2 figures, 2 tables.

47848 (CONF-8508111—Vol.2, pp 248-255) **Protecting data quality in weatherization evaluations.** Thiel, L.A.; Hewitt, D.C. (Wisconsin Energy Conservation Corp., Madison). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Qualification of data is a continuous process occurring in the selection, collection, sorting, and analysis stages of the evaluation. This paper address methods of obtaining quality data within reasonable budget limitations. Areas of concentration include phone surveys, preliminary fuels-record analysis, and final evaluation methodology for weatherization evaluations. Estimated time commitments for these stages are also discussed. Microcomputer applications developed for this analysis procedure are presented. Computerized calculation of daily degree day information for energy meter readings or fill dates, and a test of standard deviation of the fuel usage rate per degree days can speed the evaluation process while producing high quality results. Data quality problems are generally more prevalent when working with nonutility data, e.g., propane and fuel oil. This data requires additional qualitative checks to develop accurate final savings estimates. 1 figure.

47849 (CONF-8508111—Vol.2, pp 262-273) **Economic impact of energy education for limited resource households.** Williams, S.E. (Oklahoma State Univ., Stillwater). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The purpose of this research was to analyze the impact of self-help changes made by limited resource households (low-income, aged, isolated and handicapped) in their efforts to reduce their household energy use and increase the comfort of their households. The research used a benefit-cost model to assess the impact that self-help efforts had on the energy use of private households and further the potential impact of society in general. A pretest and post-test design involving three measurements of the dependent variable (household energy conservation practices) was used to assess extent of change during the one year study period. An analy-

sis of variance procedure was used to determine if a significant difference existed between the average number of conservation practices present in participant households at each data collection point. The analysis of variance indicated significant difference at the 0.0001 level. This finding indicated that significant difference existed between the number of energy conservation practices present at each of the data collection points. Energy conservation practices adopted by limited resource households were analyzed in a benefit-cost formula to assess the social return from self-help approaches for coping with energy problems. Net present value calculations yielded positive net present values. In addition, benefit-cost ratios were greater than one. These findings led to the conclusion that society, participant households, and the agency funding in the energy education project accrued significant economic benefits. These findings demonstrate the potential economic benefit of energy education for limited-resource households. 13 references, 3 tables.

47850 (CONF-8508111—Vol.2, pp 274-281) **Evaluation of Shawnee County low/fixed income consultation program.** Lonergan, J.A. (Kansas Corp. Commission, Topeka). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The Kansas Corporation Commission during Fiscal Years 84 and 85 contracted with community action agencies to present energy conservation consultations in the homes of low/fixed income families. This paper presents the results of an evaluation conducted for FY 1984 to measure program impacts. The FY 84 evaluation lacked sufficient data to be statistically reliable. In FY 85 an attempt was made to develop a statistically sound evaluation. Preliminary indications from the FY 85 report show a program impact comparable to the FY 84 study. The change in natural gas consumption among households selected for evaluation in the FY 85 study was a consumption reduction of 10/9% from the two most recent heating seasons. In the FY 84 report a consumption reduction of 10.5% was reported. Additionally, a control of non-program participants was identified for the FY 85 study and this group's consumption increased by 0.8%. 4 tables.

47851 (CONF-8508111—Vol.2, pp 294-301) **Self-selection: are we beating a dead horse?.** Keating, K.M. (Bonneville Power Administration, Portland, OR). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Self-selection bias is a logical threat to the internal validity of an evaluation. Given the voluntary nature of participating in conservation programs, it is an issue that cannot generally be avoided. However, its importance is not as clear an issue. This paper reviews some of the theoretical debate surrounding self-selection bias and discusses the relative importance of the topic given the other problems faced by professional evaluators. It concludes that self-selection is not a currently viable issue. 17 references, 1 figure, 1 table.

47852 (CONF-8508111—Vol.2, pp 302A-302J) **Alternative approaches for treatment of self-selection bias in evaluation of energy use impacts of a home weatherization kit program.** Goitein, B.; Weinstein, B. (Bradley Univ., Peoria, IL). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

Self-selection bias is a particularly troublesome instance of the broader problem posed to the evaluation researcher by nonrandom assignment. For the program considered in this paper, program design permits a comparison of entire areas selected for weatherization program availability to other similar areas outside the program, thus providing a more equivalent comparison. Self-selection bias was also addressed by comparing energy use of households that self-select into the program in one year to the historical experience of those who were to self-select into it the following year. Comparison of self-selectors to nonself-selectors, controlling for determinants of program participation and energy use is also employed. Preliminary results indicate that evaluation validity is enhanced and analytic complexity is greatly reduced when the self-selection bias is avoided by the initial design of pilot energy conservation programs. 7 references, 2 figures, 3 tables.

47853 (CONF-8508111—Vol.2, pp 313-323) **Use of detailed evaluation data to develop a low cost monitoring system: the BPA Residential Weatherization Program.** Hirst, E.; Tonn, B. (Oak Ridge National Lab., TN). 1985. NTIS, PC A15/MF A01. File Number DE86011426.

From 2. national conference on energy program evaluation; Chicago, IL, USA (19 Aug 1985).

The purpose of this project is to develop a low-cost and simple monitoring/evaluation plan for the Bonneville Power Administration (BPA) long-term Residential Weatherization Program (RWP). The need for an inexpensive and timely way to estimate program energy savings springs from problems inherent in traditional evaluations. Careful outcomes evaluations of conservation programs are expensive and time consuming; two or more years may elapse between the time of evaluation attention and the time final results are available. Perhaps, the detailed data available from such evaluations can be used to develop a reliable analytical system to monitor future performance of the same program. These thoughts led to this study of RWP. 12 references, 2 figures, 3 tables.

47854 **(DOE/CE/30805—T1) Roble House. Phase II report. Recommendations for cooling and ventilation, restoration of doors and windows, refrigerated cooling retrofit.** (Burt-Hill-Kosar-Rittelmann Associates, Washington, DC (USA)). 30 Apr 1986. Contract FG03-84CE30805. 47p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014155.

The purpose of this effort is to provide the building owner, the University of Chicago, with recommendations for cooling. Natural ventilation is the preferred method as long as it can meet the needs of a modern office. This is especially attractive given the natural cooling design features mentioned by Frank Lloyd Wright scholars and confirmed by this research.

47855 **(DOE/SF/15774—T1) Weatherization assistance program. Final monitoring report for Arizona, California, the Navajo Nation, and Nevada.** (Stroud, Inc., Arvada, CO (USA)). Aug 1986. Contract AC03-85SF15774. 28p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014699.

Stroud, Inc., was awarded a contract by the Department of Energy San Francisco Operations Office (DOE-SAN) to evaluate the weatherization programs for selected grantees and subgrantees in Arizona, California, the Navajo Nation, and Nevada. This final report summarizes both the findings and the recommendations that emerged from the forty (40) visits to grantees and subgrantees. The remarks are not intended to be detailed and exhaustive. Specific problems, achievements, and recommendations are to be found in the narrative reports. But some findings and traits are sufficiently general that they warrant being included in this final report. The recommendations reflect those general characteristics.

47856 **(LBL—11386) Ventilation cooling of residential buildings.** Kammerud, R.C.; Ceballos, E.; Curtis, B.; Place, W.; Andersson, B. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 30p. (CONF-8401117—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013010.

From ASHRAE semi-annual meeting; Philadelphia, PA, USA (1 Jan 1984).

The effectiveness of ventilating residential buildings with unconditioned outdoor air as an adjunct to, or replacement for conventional vapor-compression air conditioning has been examined. The work reported was based on total energy analyses of a prototypical residential building in 24 locations throughout the continental United States. The energy analyses assumed fan-forced ventilation and examined the relative merits of various control strategies and various configurations of thermal mass within the building. Where possible, the results of these studies are extrapolated to conditions of natural ventilation. The primary conclusions are that: (1) ventilation has the potential to substantially reduce cooling energy use in the residential sector, (2) levels of thermal mass above those typically found in new construction enhance the effectiveness of ventilation and reduce peak energy use, and (3) to realize a significant fraction of the benefits of ventilation over conventional air-

conditioning technology, effective means must be developed for exchanging heat with the external environment without allowing intrusion of moisture-laden air.

47857 **(LBL—17562) Total building impacts of south-facing roof apertures.** Andersson, B.; Adegran, M.; Albrand, P.; Kammerud, R.; Webster, T. (Lawrence Berkeley Lab., CA (USA)). Mar 1984. Contract AC03-76SF00098. 9p. (CONF-840610—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013649.

From Windows in building design and maintenance conference; Gothenburg, Sweden (13 Jun 1984).

The US Department of Energy's Passive Experimental Non-Residential Buildings Program has resulted in the design, construction, and instrumentation of nearly twenty commercial buildings throughout the United States (Gordon 1982). Of these buildings, more than eighty percent employ south-facing roof apertures as a major component of their passive systems. These buildings provided an opportunity to investigate the impact of roof apertures with reapect to such issues as occupant response to the naturally lit environment, effectiveness of electric lighting control, and secondary effects such as changes to the radiant and acoustic environments.

47858 **(PNL-SA—13260) Field measurements of cooling energy consumption in a multi-zone office building.** Heidell, J.A.; Taylor, Z.T. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1985. Contract AC06-76RL01830. 13p. (CONF-8509126—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011627.

From Hot humid climate conference; College Station, TX, USA (24 Sep 1985).

This paper discusses the cooling energy use in a small office building with the objective of developing an understanding of where energy is used and identifying relationships between cooling energy and other energy end uses. The goal is to translate this understanding into strategies for reducing cooling energy consumption in new buildings. The data presented in this paper are based upon empirical hourly end-use energy monitoring in a 20,500 square foot office building located in Richland, Washington. Hourly end-use energy and microclimate data have been collected for the past two years as a pilot metering project for a larger data collection effort in conjunction with the Commercial Building Energy Use and Design Program managed by Pacific Northwest Laboratory for the US Department of Energy.

47859 **(SERI/SP—273-2937) Passive solar manufactured buildings: design, construction, and class B results. Second edition.** Lane, R. (ed.). (Solar Energy Research Inst., Golden, CO (USA)). Jun 1986. Contract AC02-83CH10093. 163p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE86004440.

The Passive Solar Manufactured Buildings Program included twenty-six projects by twenty manufacturers. Eight of the projects were carried through all phases of the program: design, construction, and performance monitoring. These eight are presented in Part I and Part II of this report. The other eighteen projects progressed through the design phase, but were not constructed and monitored under the program. These projects are described in the Appendix.

47860 **(SERI/TP—254-2999) Measurement of effective thermal capacitance in buildings.** Subbarao, K.; Burch, J.; Hancock, E.; Jeon, H. (Solar Energy Research Inst., Golden, CO (USA)). Jul 1986. Contract AC02-83CH10093. 16p. (CONF-851202—15). NTIS, PC A02/MF A01; GPO Dep. File Number DE86010725.

From DOE-ORNL-ASHRAE-BTECC conference on thermal performance of the exterior envelopes of buildings-III; Clearwater Beach, FL, USA (2 Dec 1985).

A short-term test method to measure the effective heat capacitance of a building is presented. The effective heat capacitance is defined in terms of the indoor temperature response to sinusoidal eat input; i.e., in terms of the thermal admittance. This definition is shown to yield a useful and measurable quantity, which can be related to a capacitance in a thermal circuit. A signal enhancement principle is introduced that allows accurate and repeatable measurements. the method is illustrated with data from a single family residence as well as a test cell. When additional mass was introduced into the test cell in the form of water containers, there was a well-determined change in admittance that agreed with expected change. Among the applications of this method are (1) diagnostics (measured versus calculated heat capacitance), and (2) a measurement-based characterization of heat capacitance effects of furnishings, for use in simulations.

47861 **Manipulation of effective vapor pressure curves by thermodynamic cycles.** Radermacher, R. (Dept. of Mechanical Engineering, Univ. of Maryland, College Park, MD). pp 119-123 of Technical economics, synfuels and coal energy - 1986. Dicks, J.B. New York, NY; American Society of Mechanical Engineers (1986). (CONF-860201—).

From Energy-sources technology conference and exhibition; New Orleans, LA, USA (23 Feb 1986).

The performance of a two-stage Rankine cycle employing a working fluid mixture and solution circuits has been computed with reference to heat pump applications. Its performance is compared to the single-stage version of this cycle. It is found that the two-stage cycle operates along an 'effective' vapor pressure curve of very flat slope, resulting in pressure ratios which are reduced to about one third compared to conventional cycles. For large temperature differences between heat sink and source the Coefficient of Performance (COP) is increased by up to 50%.

47862 **On the vertical integration of thermally activated heat pumps.** Chen, F.C. (Energy Div., Oak Ridge National Lab., Oak Ridge, TN). pp 145-147 of Technical economics, synfuels and coal energy - 1986. Dicks, J.B. New York, NY; American Society of Mechanical Engineers (1986). (CONF-860201—). Contract AC05-84OR21400.

From Energy-sources technology conference and exhibition; New Orleans, LA, USA (23 Feb 1986).

Many thermally activated heat pump systems are being developed along technology lines, such as engine-driven and absorption heat pumps. Their thermal performances are temperature dependent. Based on the temperature-dependent behavior of heat pump cycle performance and the energy cascading idea, the concept of vertically integrating various thermally activated heat pump technologies to maximize resources utilization is explored. Based on a preliminary analysis, it is found that the integrating a desiccant dehumidification subsystem to an engine-driven heat pump could improve its cooling performance by 36% and integrating an ejector to it could improve its cooling performance by 20%. The added advantage of an ejector-coupled engine-driven heat pump is its system simplicity, which should result in equipment cost savings.

47863 **The control of daylight-linked lighting systems.** Rubinstein, F.; Ward, G. (Lighting Systems Research, Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). pp 1249-1252 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—). Contract AC03-76SF00098.

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

This paper describes the components of a daylight-linked lighting system and presents three simple control algorithms that can be incorporated into a control system to achieve the design objective of constant task illuminance.

47864 **Defining daylighting from windows in terms of candlepower distribution curves.** Spitzglas, M. (Windows and Daylighting Group, Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). pp 1253-1258 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—). Contract AC03-76SF00098.

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

This work describes a method for evaluating quantitatively the daylight admittance of windows under any outdoor conditions in terms that make it possible to calculate interior light distribution. The visible daylight flux introduced through a window (or other daylight-admitting aperture) can be considered, from the point of view of the internal space, as being emitted from a point source or

from a finite-area uniform source. The photometric properties of those light sources are designed in terms of the well-known candlepower distribution curves. The ways in which this approach can can be applied for different window designs are demonstrated. This approach to the photometric properties of window systems allows one to translate typical daylighting calculation problems into a format in which they can be resolved using tradition electric lighting calculations or computer codes. Even "daylighted-oriented" computer codes are limited as to the geometric complexity of the windows they can model-this method eliminates such limitations. It will also contribute to a better understanding and visualization of the photometric properties of various windows and other daylight-admitting elements. This approach, therefore, may also serve as an educational tool.

47865 **Development of novel lamps for study of enhanced production of resonance radiation by low-density mercury discharges.** Wang, Z.X.; Hollister, P.P.; Berman, S.M. (Lighting Systems Research, Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). pp 1259-1262 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—). Contract AC03-76SF00098.

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

A novel mercury-argon discharge tube is described. It incorporates two identical condensation pump "cold spots" that are employed to determine both the mercury sorption rate and the coefficient of free diffusion for mercury in argon. Equilibration periods for this systems are found to depend in part on the temperature difference between the two cold-spots surfaces, and on the separation of these surfaces. Sorption of mercury at the discharge tube's surface, and the subsequent cleanup of the mercury charge, is determined by the time rate of change in the equilibration period. Data accumulated during theses test are incorporated into the design scheme of discharge tubes intended for Zeeman-effect and isotope blending studies described elsewhere.

47866 **Electromagnetic interference from fluorescent lighting operated with solid-state ballasts in various sites.** Harms, M.G.A.; Leung, L.P.; Verderber, R.R. (Lighting Systems Research, Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). pp 1267-1274 of Conference record of the Industry Applications Society IEEE-IAS-1984 annual meeting. Piscataway, NJ; IEEE Service Center (1984). (CONF-8409108—). Contract AC03-76SF00098.

From IEEE-IAS meeting; Chicago, IL, USA (30 Sep 1984).

Solid-state ballasts with 20-30 kHz fundamental frequencies were used to operate fluorescent lamps in office, screen room, and open-field sites. The test equipment and layout are described and the radiated and conducted electromagnetic interference (EMI) data are given for six commercially available ballasts from different manufacturers. EMI data from each location are presented that indicate the suitability of using an office site for future EMI measurements. Broadband EMI data are compared with data from a spectrum analyzer, which justifies the use of an RMS voltmeter in these measurements. A reduction in radiated EMI of 36 dB is achieved by replacing a strip fixture with an EMI-hardened fixture that has a wire grid embedded in its lens. Results of increasing lamp/antenna distance are given; we verify that, for distances greater than 1 meter, the radiated EMI amplitude drops off as a function of $1/d^2$.

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47867 **(CONF-8606112—3) Transportation energy demand from 1980 to 2010: structure and results of the Transportation Energy and Emissions Modeling System.** Vyas, A.; Millar, M.; Patterson, P. (Argonne National Lab., IL (USA); USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC. Office of Transportation Systems). 1986. Contract W-31109-ENG-38. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014495.

From IASTED modelling and simulation conference; Vancouver, Canada (4 Jun 1986).

As part of ongoing work for the US Department of Energy (DOE), Argonne National Laboratory's Center for Transportation Research develops detailed forecasts of US transportation energy demand, by mode and fuel type. These forecasts are generated by a model system of linked component modules of local personal travel demand, intercity travel demand, and goods movement. The local personal travel component uses an iterative proportional fitting technique to project household characteristics by several demographic variables and an incremental logit model to predict changes in household vehicle holdings. The intercity travel module is a network-based, direct-demand formulation based on utility-maximizing principles. The freight module is driven by econometric forecasts of sectoral output. Mode shares are determined by sampling a series of probability-density functions of shipment attributes and shipper preferences. Major inputs include exogenous economic, demographic, and price assumptions; outputs include long-range modal and submodal forecasts of transportation stock, activity, and energy demand. This paper documents the methodology and presents selected results from the latest run of the model system.

47868 **(DOE/ER/30063—H2) Advanced propulsion systems and alternative fuels for non-highway transportation. Annex and compendium of research and development. [Final report. Volume 3].** (Mueller Associates, Inc., Baltimore, MD (USA)). Jan 1986. Contract AC01-84ER30063. 69p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86013158.

Based upon earlier prioritization and assessment analyses, a selection of R and D needs were identified for non-highway transportation. The Department of Energy's Office of Program Analysis (DOE-OPA) in recognizing the likelihood of only limited Federal Government monetary support of Non-Highway R and D, requested that these R and D needs be further prioritized to a limited number (four to six) of recommendations. This paper presents the logic and rationale for arriving at this much smaller set of R and D priorities and re-summarizes the specific R and D needs and their potential benefits and/or utility.

47869 **(DOE/METC—86/6044) Assessment of coal-fueled locomotives.** (USDOE Morgantown Energy Technology Center, WV). Jul 1986. 174p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE86006620.

During the last decade there have been considerable activities in the development of a coal-fueled locomotive. Organizations of various kinds (locomotive manufacturers and others) have developed or are developing various concepts. Advanced microprocessing technology and improved materials of construction, heat engine technology, and coal fuel processing all are converging to make a coal-fueled locomotive economically possible. It is the conclusion of this assessment that coal-fueled locomotives using indirect-fired heat engines and direct-fired heat engines with onboard fuel conversion could be available in the near term (within 5 years). However, these systems are only marginally attractive from an economic viewpoint and have some operational disadvantages. Current low petroleum fuel prices may deter this concept from being commercialized. Coal-fueled locomotives using direct-fired heat engines offer high payoffs even with modest gains in diesel fuel oil prices over coal prices. Intensive R & D is presently being carried out on the technical issues facing this approach. It is likely that proof of concept can be achieved during the next 5 to 7 years. 67 refs., 26 figs., 43 tabs.

47870 **(PB—86-205192/XAB) Energy analysis and alternative fuels and vehicles.** Brunso, J.M.; Hartgen, D.T.; Singh, M.K.; Teotia, A.P.S.; Johnson, L.R. (National Research Council, Washington, DC (USA). Transportation Research Board). 1985. 109p. (TRB/TRR—1049). NTIS, PC A06/MF A01.

The 12 papers in the report deal with the following areas: consumer trade-offs between mobility maintenance and gasoline savings; environmental concerns of natural gas vehicles: do we know enough; structural ceramics in transportation: fuel implications and economic effects; commercialization of major efficiency-enhancing vehicular engine innovations: past, present and future micro-and macroeconomic considerations; a quick assessment of local area impacts resulting from national energy shortages; define relationships between urban form and travel energy; an analysis of trends in automotive fuel economy from 1978 - 1984; long-term out-

look for transportation energy demand; the potential market for electric vehicles: results from a national survey of commercial fleet operators; alternative fuels for buses: current assessment and future perspectives; user costs and fuel consumption at drive-through facilities; utility industry progress toward implementing electric vehicle introduction.

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REFER ALSO TO CITATION(S) 47232, 47386, 47748, 47958

47871 **(BMFT-FB-T—86-001) Development of coating materials and feeding processes for energy-optimized baking of carbon products. Final report.** Schroeder, K.J.; Schroeder, P.; Grimm, B. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Jan 1986. 75p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752552.

Carbon products, as for instance anodes for the aluminium industry, are worldwide baked in annular chamber furnaces with a lump fill of granular coke. The large thermal mass of this coke fill requires a high energy consumption and long baking times. This fill shall be replaced by a ceramic coating material in order to obtain shorter baking times and lower energy consumption. Within this development project, various coating materials, application techniques and baking processes were tested. The results show that carbon products of perfect quality can be obtained within much shorter baking times. In practice-like tests at a German factory producing refractory products it was found during a test period of one year, that the energy savings amount to 70%. For the production of carbon anodes in the aluminium industry energy savings up to 50% are possible, according to our test results. The corresponding plant designs have been developed within the framework of the R and D project. With 5 refs., 3 tabs., 10 figs.

47872 **(BMFT-FB-T—86-035) Introduction of a secondary blast process into an unlined hot-blast cupola furnace. Final report.** Braun, U.; Lohmann, G. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Salzgitter A.G. (Germany, F.R.)). Feb 1986. 23p. (In German). NTIS (US Sales Only), PC A02/MF A01. File Number DE86752555.

In a series of comprehensive tests lasting 18 months the relationship between the CO-content of the waste gas from a hot-blast cupola furnace and the amount of secondary blast was determined. The additional CO-combustion by means of the secondary blast and the quantity of heat produced could be completely utilized in the smelting operation and this led to a saving in coke corresponding to the quantity of additional heat. The tests have shown that by blasting in secondary air, a combustion of CO to CO_2 takes place which is to a great extent in the stoichiometric ratio to the amount of oxygen. With 3 tabs., 9 figs.

47873 (CONF-8510259—, pp 3-5) **Temperature by time of flight of sound waves.** Parthasarathy, S. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

Transit times of sound waves over a path through a medium, e.g., hot gases, can be measured with a simple transducer. Average times over the whole path are easier to measure than local values over a small region and may be useful enough to be directly applicable to the determination of the average temperature across a boiler or lime kiln. Local values can be determined by using the information on transit times across two laser beams which sense sound waves. A potential problem with this approach is the need to know the chemical composition of the gas, which influences the speed of sound. A possible solution to this problem is to use a tube filled with nitrogen and pulse the sound waves through the known gas.

47874 (CONF-8510259—, pp 5-7) **Polymeric hygrometer sensor.** Parthasarathy, S. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The objective of this project is to study the feasibility of using a polymeric hygrometer for determining the relative humidity in the pulp and paper industry. The material being investigated for use in the sensor is nafion, which is a solid fluorocarbon polymer electrolyte that has a conductivity which varies as a function of relative humidity and temperature. A prototype sensor system has been fabricated and preliminary laboratory and mill tests are being conducted. During the initial 20 hours of testing the hygrometer reading agreed with measurements performed by using a wet and dry bulb thermometer. The results of the tests are discussed.

47875 (CONF-8510259—, pp 7-8) **Steam flow meter (JPL).** Parthasarathy, S. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

Aeroacoustic sources can produce sound waves in a steam pipe by using the energy of flow itself. There are no limitations of temperature and pressure and there are no moving parts. In this method, (c + u) and (c - u) are directly measured by the time-of-flight of sound waves with and against the flow. The temperature which depends on c and u are directly measured. Experiments on this concept using several types of sources are described.

47876 (CONF-8510259—, pp 9-12) **In-situ combustion control.** Charagundla, R. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The spectroscopic in-situ combustion temperature measurement technique is based on the measure of emission intensities from the combustion zone. Field trips to two paper companies produced information on the emission spectra from recovery boilers. Information on the emission spectra in the wavelength range of 300 to 800 nm was obtained. The studies indicated that line emission intensities at two different wavelengths (404.4 nm and 766.5 nm) can be used to estimate gas temperatures by the line intensity ratio. The temperatures estimated using this method were found to compare favorably with calculated adiabatic flame temperatures.

47877 (CONF-8510259—, pp 12-15) **Consistency sensor.** Gaigalas, A. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The development of a new technique for the on-line measurement of pulp consistency which has improved performance characteristics over currently available devices is discussed. The approach uses an RF technique in which the pipeline carrying the pulp flow is used as a waveguide. Radio frequency energy is introduced into the waveguide at two points such that EM waves traveling in opposite directions pass through the field strength detector portion of the sensor. Interference between the two waves causes modulation of the power level in the waveguide. This modulation is detected by a diode array flush mounted to the waveguides inner wall. Analysis of the power modulation data results in a measurement of the wavelength and attenuation of the EM field in the waveguide. From these measurements, the dielectric properties of the material feeling the waveguide can be determined. Since the dielectric constants of water and cellulose differ by a factor of about 20, the volume fraction of cellulose may be determined.

47878 (CONF-8510259—, pp 15-17) **Steam flow meter (NBS) work sheet - preliminary results.** Emerson, D. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

An evaluation of the NBS steam flow meter is presented. NBS had demonstrated the technical feasibility of a non-intrusive meter that provides a continuous measurement of steam temperature, velocity, and mass flow. However, the relatively large meter length requirements and materials/engineering problems associated with the sound source presented potential problems that might significantly detract from widespread industry acceptance. A summary of the findings of a potential user acceptability survey are presented.

47879 (CONF-8510259—, pp 17-19) **Process sensor availability and needs - draft report summary.** Emerson, D. 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

At a previous Sensor Working Group meeting it was recommended that DOE consider conducting a survey study of the current status of sensors used by the pulp and paper industry. In response to the recommendations, DOE authorized a two-part effort to determine equipment availability and acceptability. The results of this study on process sensor and availability needs are presented.

47880 (CONF-8510259—, pp C.2-C.16) **Steam flow meter.** Parthasarathy, S.P.; Kwack, E.Y. (California Institute of Technology, Pasadena). 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The development of a steam flow meter is summarized. The meter uses an aeroacoustic source located at the center of a free jet issuing from a nozzle. The jet flow speed is 150 m/s. Data are presented on the sound pressure levels in the pipe and in the jet.

47881 (CONF-8510259—, pp C.18-C.23) **DOE-JPL hygrometer.** Lawson, D.D.; Parthasarathy, S.P. (California Institute of Technology, Pasadena). 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The objective of this project is to investigate the feasibility of using a polymeric hygrometer for determining relative humidity in the pulp and paper industry. The material being investigated for use in the sensor if nafion, which is a solid fluorocarbon polymer electrolyte that has a conductivity which varies as a function of relative humidity and temperature. A prototype sensor system has been fabricated and preliminary laboratory tests conducted.

47882 (CONF-8510259—, pp D.5-D.56) **Spectroscopic temperature measurement technique for recovery boilers.** Charagundla, S.R.; Semerjian, H.G. (National Bureau of Standards, Gaithersburg, MD). 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The objective of this study was to develop an in-situ spectroscopic temperature measurement technique for combustion control in black liquor fired recovery boilers. The approach was to identify spectra and establish relationships between stoichiometry and line intensity ratios and to develop and fabricate a portable fiber optic probe/detector system for temperature measurement in black liquor recovery boilers. Conclusions and recommendations for future work are presented.

47883 (CONF-8510259—, pp E.2-E.17) **New approach to the measurement of paper pulp consistency.** Gaigalas, A.K. (National Bureau of Standards, Gaithersburg, MD). 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The effective dielectric constant of a paper pulp slurry flowing in a pipe with diameter equal to 6.25 inches was determined by measuring the wavelength, frequency, and attenuation of radio waves propagating inside the pipe. The solids percent was obtained from the effective dielectric constant by using a mixing model. Good agreement was obtained with values of percent solids (cellulose) obtained from grab sample measurements.

47884 (CONF-8510259—, pp F.1-F.11) **Research on the behavior of non-process elements in alkaline pulp mills.** Frederick, W.J. Jr. (Oregon State Univ., Corvallis). 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

The behavior of non-process elements in alkaline pulp mills is described. Examples of such inorganic elements in chemical pulping cycles not associated with active pulping chemicals include Al, Ca, Cl, Fe, K, Mg, Mn, and Si. The impact of non-process elements on capital and energy requirements in mill design and operation is discussed.

47885 (CONF-8510259—, pp G.2-G.67) **Presentation summary of The National Bureau of Standards steam flowmeter worksheet.** 31 Oct 1985. NTIS, PC A10/MF A01. File Number DE86005722.

From DOE/industry advanced research and development sensor working group meeting; Chicago, IL, USA (31 Oct 1985).

A summary of the work at NBS on the development of a steam flowmeter is presented. The objectives of the work were to: (1) obtain information on the potential user acceptance of a NBS-developed non-intrusive steam flowmeter, (2) evaluate the information obtained, (3) determine which criteria are associated with high and low potential user acceptance, and (4) to summarize and report the findings for use in an overall evaluation of the steam flowmeter development effort.

47886 (DOE/ID/12502—1) **Development of synergistic waste treatment into applied technology.** Tabor, W.E.; Dempsey, D.G.; Taylor, S.J.; Ervin, A. (Enwright Research Corp., Greenville, SC (USA)). Jul 1986. Contract AC07-84ID12502. 218p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE86014115.

The contract terms were carried out as specified by DOE with the authors investigating known or practical examples of synergistic and antagonistic effects resulting of mixing of wastewater streams. Databases were compiled on the waste stream characteristics and waste treatment practices of 12 subcategories of the chemical and allied products industry. Both a qualitative and quantitative computer model were developed to select appropriate treatment procedures and to predict the potential interactive effects upon the mixing of two streams; afterward, the data were supplemented by calculation of energy use and calculation of potential savings which could occur from beneficial interactions between the streams. Results of about seven simulation trials indicate potential energy conservations if the concepts are developed and used. This project has yielded great opportunity for deployment of a new concept in wastewater treatment practices.

47887 (DOE/ID/12539—T1) **Evaluation of ceramic construction joints for application to high recuperative heat exchangers. Final report.** Dennis, A.J. (United Technologies Research Center, East Hartford, CT (USA)). Jan 1986. Contract AC07-84ID12539. 31p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014122.

Certain ceramic composite materials are potentially well suited to being used as joints and seals. These materials are attractive because of their compliance, toughness and thermal expansion properties. Various joint designs, which take advantage of the differential thermal expansion between the ceramic heat exchanger tube and the ceramic composite sleeve, were analyzed. The differential thermal growth provided a sealed joint. The primary design parameters of cold assembly clearance (gap), joint engagement length (lap) and thickness distribution (taper) of the sleeve were selected to place the maximum stresses in the ceramic composite sleeve while maintaining the ceramic tube in an acceptably low compressive stress state. Standard finite element analyses were conducted. The initial cold clearance (gap) was determined to be the most effective design parameter in reducing the strsses in the joint; that is, the larger the gap the lower the maximum joint stresses at operating conditions.

3206 Municipalities And Community Systems

47888 (BMFT-FB-T—86-002) **Briquetting of refuse and sewage sludge for energy recovery. Final report.** Kneer, F.; Henzel, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Jan 1986. 65p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752548.

Refuse and sewage sludge were converted in a bio-process at temperatures up to 80° (process heat). The material obtained was

briquetted and stored. Fractionation was carried out if necessary. The bricks are suited for storage, transportation and combustion. The first combustion tests showed good results. With 6 tabs., 53 figs.

47889 **(BNL—51999) District heating and cooling market potential and penetration methodology. Final report.** Metz, P.D.; Gleason, J. (Brookhaven National Lab., Upton, NY (USA)). Mar 1986. Contract AC02-76CH00016. 61p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014740.

This report describes the district heating and cooling (DHC) market potential and penetration methodology development tasks performed under Part I of the project "District Heating and Cooling Market Potential and Penetration Study" for the US DOE. Market potential and penetration methodologies were surveyed to identify those suitable for assessing the feasibility of DHC systems in the US, i.e., of translating the characteristics of each system to its market response. Each methodology was evaluated in terms of its level of detail, data requirements, costs, and other factors. A "preferred" methodology was developed, and a prognosis for implementing the preferred methodology was made.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

3301 Internal Combustion Engines

REFER ALSO TO CITATION(S) 47373, 47901

47890 **(BMFT-FB-T—86-011) Development and testing of a washing process for exhaust gas of stationary operated internal combustion engines. Final report.** Coutelle, R.; Huss, R.; Wimberger, H.J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Jan 1986. 154p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE86752550.

An exhaust gas washer for stationary operated diesel engines has been developed and tested in combination with a heat pump. The exhaust gas is washed with its own condensate in a packed column. The condensate circulation is performed by mammoth pumps. The pollutant emissions have been reduced depending on operating conditions (speed, temperature, pH of the condensate) by the following rates: HC by 30-85%, aldehydes by 35-99%, phenols by 50-80%, PAH by 80-95%, soot by 25-70%, SO_2 by 65-90%, NOsub(x) by 5-20%. It has been possible to reduce the NOsub(x) emissions by 75% at an inconsiderably increased fuel consumption by recycling exhaust gases. But higher soot emissions have to be accepted in this case. The condensate is completely degradable in a septic tank after being mixed with waste water containing phosphate. With 42 refs., 13 tabs., 32 figs.

47891 **(BMFT-FB-T—86-027) Ceramic components, gas turbines. Phase 3.** Moergenthaler, K.D.; Tiefenbacher, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Jun 1986. 179p. (In German). NTIS (US Sales Only), PC A09/MF A01. File Number DE86752673.

In the research program 'Ceramic Parts for Gas Turbines' Daimler-Benz AG has been active in the following fields: turbine rotor, turbine scroll and recuperative heat exchanger. The main emphasis of development work at Daimler-Benz AG was placed on monolithic turbine wheels. A number of turbine wheels of different design have been manufactured by a process which has been developed by Daimler Benz AG. The rotors were tested successfully. Some compressor- and power turbine wheels used in the Mercedes-Benz gas turbine. The stress analysis of the gas turbine wheels was made by using 2D- and 3D-finite element computer programs. As part of IEA-program Ford Motor company, USA and Daimler-Benz made a comparison of their calculations of turbine discs. First turbine scrolls and samples of a recuperative heat exchanger have been tested. With 32 refs., 16 tabs., 128 figs. Phase 1 see BMFT-FB-T--79-153.

47892 **(N—86-22713) Thermal barrier coating life prediction model development. Annual Report.** Sheffler, K.D.; Demasi, J.T. (Pratt and Whitney Aircraft, East Hartford, CT (USA)). Nov 1985. 92p. (NASA-CR—175087; AR—1). NTIS, PC A05/MF A01.

A methodology was established to predict thermal barrier coating life in an environment simulative of that experienced by gas turbine airfoils. Specifically, work is being conducted to determine failure modes of thermal barrier coatings in the aircraft engine environment. Analytical studies coupled with appropriate physical and mechanical property determinations are being employed to derive coating life prediction model(s) on the important failure mode(s). An initial review of experimental and flight service components indicates that the predominant mode of TBC failure involves thermomechanical spallation of the ceramic coating layer. This ceramic spallation involves the formation of a dominant crack in the ceramic coating parallel to and closely adjacent to the metal-ceramic interface. Initial results from a laboratory test program designed to study the influence of various driving forces such as temperature, thermal cycle frequency, environment, and coating thickness, on ceramic coating spalling life suggest that bond coat oxidation damage at the metal-ceramic interface contributes significantly to thermomechanical cracking in the ceramic layer. Low cycle rate furnace testing in air and in argon clearly shows a dramatic increase of spalling life in the non-oxidizing environments.

47893 **(N—86-22892) Heat transfer to two-phase air/water mixtures flowing in small tubes with inlet disequilibrium. Final Report.** Janssen, J.M.; Florschuetz, L.W.; Fiszdon, J.P. (Arizona State Univ., Tempe (USA)). Mar 1986. 100p. (NASA-CR—175076). NTIS, PC A05/MF A01.

The cooling of gas turbine components was the subject of considerable research. The problem is difficult because the available coolant, compressor bleed air, is itself quite hot and has relatively poor thermophysical properties for a coolant. Injecting liquid water to evaporatively cool the air prior to its contact with the hot components was proposed and studied, particularly as a method of cooling for contingency power applications. Injection of a small quantity of cold liquid water into a relatively hot coolant air stream such that evaporation of the liquid is still in process when the coolant contacts the hot component was studied. No approach was found whereby heat transfer characteristics could be confidently predicted for such a case based solely on prior studies. It was not clear whether disequilibrium between phases at the inlet to the hot component section would improve cooling relative to that obtained where equilibrium was established prior to contact with the hot surface.

47894 **(N—86-24933) Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements. Final Report.** Schweikhard, W.G.; Chen, Y.S. (Kansas Univ. Center for Research, Inc., Lawrence (USA)). Apr 1986. 216p. (NASA-CR—176764). NTIS, PC A10/MF A01.

The Melick method of inlet flow dynamic distortion prediction by statistical means is outlined. A hypothetic vortex model is used as the basis for the mathematical formulations. The main variables are identified by matching the theoretical total pressure rms ratio with the measured total pressure rms ratio. Data comparisons, using the HiMAT inlet test data set, indicate satisfactory prediction of the dynamic peak distortion for cases with boundary layer control device vortex generators. A method for the dynamic probe selection was developed. Validity of the probe selection criteria is demonstrated by comparing the reduced-probe predictions with the 40-probe predictions. It is indicated that the the number of dynamic probes can be reduced to as few as two and still retain good accuracy.

47895 **(N—86-24938) Dilution jet mixing program, phase 3. Final Report.** Srinivasan, R.; Coleman, E.; Myers, G.; White, C. (Garrett Turbine Engine Co., Phoenix, AZ (USA)). Sep 1985. 186p. (NASA-CR—174884; GARRETT—21-5418). NTIS, PC A09/MF A01.

The main objectives for the NASA Jet Mixing Phase 3 program were: extension of the data base on the mixing of single sided rows of jets in a confined cross flow to discrete slots, including streamlined, bluff, and angled injections; quantification of the effects of geometrical and flow parameters on penetration and mixing of multiple rows of jets into a confined flow; investigation of inline, staggered, and dissimilar hole configurations; and development of empirical correlations for predicting temperature distributions for discrete slots and multiple rows of dilution holes.

47896 **(N—86-25003) Life prediction and constitutive models for engine hot section anisotropic materials program. Annual Status Report.** Swanson, G.A.; Linask, I.; Nissley, D.M.; Norris, P.P.; Meyer, T.G.; Walker, K.P. (Pratt and Whitney Aircraft, East Hartford, CT (USA)). Feb 1986. 203p. (NASA-CR—174952; PWA—5968-19). NTIS, PC A09/MF A01.

This report presents the results of the first year of a program designed to develop life prediction and constitutive models for two coated single crystal alloys used in gas turbine airfoils. The two alloys are PWA 1480 and Alloy 185. The two oxidation resistant coatings are PWA 273, an aluminide coating, and PWA 286, an overlay NiCoCrAlY coating. To obtain constitutive and/or fatigue data, tests were conducted on coated and uncoated PWA 1480 specimens tensilely loaded in the 100, 110, 111, and 123 directions. A literature survey of constitutive models was completed for both single crystal alloys and metallic coating materials; candidate models were selected. One constitutive model under consideration for single crystal alloys applies Walker's micromechanical viscoplastic formulation to all slip systems participating in the single crystal deformation. The constitutive models for the overlay coating correlate the viscoplastic data well. For the aluminide coating, a unique test method is under development. LCF and TMF tests are underway. The two coatings caused a significant drop in fatigue life, and each produced a much different failure mechanism.

47897 **(N—86-25476) Tribolgy of selected ceramics at temperatures to 900 deg C.** Sliney, H.E.; Jacobson, T.P.; Deadmore, D.; Miyoshi, K. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 23p. (NASA-TM—87267; E—2969; CONF-860152—6). NTIS, PC A02/MF A01.

From 10. annual conference on composites and advanced ceramic materials; Cocoa Beach, FL, USA (19 Jan 1986).

Results of fundamental and focused research on the tribological properties of ceramics are discussed. The basic friction and wear characteristics are given for ceramics of interest for use in gas trubine, adiabatic diesel, and Stirling engine applications. The importance of metal oxides in ceramic/metal sliding combinations is illustrated. The formulation and tribological additives are described. Friction and wear date are given for carbide and oxide-based composite coatings for temperatures to at least 900 C.

3302 External Combustion Engines

47898 **Heat pipe Rankine engine.** Chuah, Y.K.; Kreith, F. (Solar Energy Research Institute, Golden, CO). pp 3.616-3.619 of Intersociety energy conversion engineering conference, 20th, Miami Beach, FL, August 18-23, 1985, Proceedings. Volumes 1, 2, & 3. Warrendale, PA; Society of Automotive Engineers, Inc. (1985). (CONF-850808—).

From 20. intersociety energy conversion engineering conference; Miami Beach, FL, USA (18 Aug 1985).

The heat pipe Rankine (HPR) engine is a new concept for small scale power generation that uses heat and mass transport features of a heat pipe. A heat pipe is a heat transfer device in which heat is transferred efficiently from the evaporator section to the condenser section. Mechanical work is produced by a turbine placed in the vapor flowing between the evaporator and the condenser sections. As an external combustion engine, the HPR engine can utilize energy sources at various temperature levels and be adapted to different applications. 7 references.

3303 Electric-powered Systems

REFER ALSO TO CITATION(S) 47761

47899 **(DOE/CS/50101—T15) Program Management for the US Department of Energy Electric and Hybrid Vehicles Program. Fifty-first monthly progress report, October 1985.** (Aerospace Corp., Washington, DC (USA). Electric and Hybrid Vehicle Directorate). Oct 1985. Contract AC08-80CS50101. 144p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86014038.

Public Law 94-413, as amended by Public Law 95-238, authorizes the Department of Energy (DOE) to sponsor research, development, testing, and evaluation efforts to accelerate the development of electric and hybrid vehicles. Since its inception in 1976, the DOE Electric and Hybrid Vehicle (EHV) Program has sponsored a wide range of activities aimed at improving batteries, components, subsystems, and complete vehicles. Those activities involve a similarly broad range of technologies, and a multidisciplinary team is required to manage and monitor the activities effectively. The objective of the EHV Program is to expeditiously maximize the national petroleum savings potential of EHVs while providing energy and petroleum flexibility for the nation. This goal will be achieved by accelerating the research and development (R and D) of those technologies that could provide vehicles conductive to significant market penetration.

47900 **(EPRI-EM—4689) Ac power trains for electric vehicles. Final report.** Hamilton, W. (Hamilton (William), Santa Barbara, CA (USA)). Jul 1986. 24p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920428.

The use of smaller, lower-cost inverters in ac power trains will soon make them superior to their dc counterparts for electric vehicles. This analysis of the cost, weight, and performance of several power trains indicates that the ac technology will also reduce the cost and increase the range of the vehicles it propels.

3304 Hybrid Systems

REFER ALSO TO CITATION(S) 47899

3307 Emission Control

REFER ALSO TO CITATION(S) 47890

47901 **(AD-A—167629/5/XAB) Agglomerating self-cleaning air cleaner. Final report.** Treuhaft, M.B. (Southwest Research Inst., San Antonio, TX (USA). Dept. of Engine and Vehicle Research). Oct 1985. 133p. (SWRI—03-7442). NTIS, PC A07/MF A01.

This report describes an experimental program to evaluate an agglomerating self-cleaning air cleaner concept for application to diesel-powered tactical trucks and combat vehicles. Technical feasibility was evaluated through laboratory testing of candidate agglomerating media and through a design parameter component study of the agglomerator, inertial separator, and final filter integration and system operation. Several factors were used to evaluate media potential: namely, initial resistance as a function of airflow, dust loading, and pressure-drop recovery; the improvement in inertial separator efficiency (an indirect measure of agglomerate transport); overall operating efficiency; and consideration of the physical characteristics of the media with respect to their likely influence on design. Both surface loading and depth-type media were considered, and successful results were obtained with each. Overall, results clearly show that the agglomerating self-cleaning air cleaner concept can provide a significant improvement over standard systems with respect to service life. As a result, an air-cleaner system based on this concept would fill the void between larger self-cleaning air filter (SCAF) units and the smaller cylindrical units currently used on many tactical trucks and small combat vehicles. This will allow the smaller vehicles, which cannot readily accept extended-life units, to function satisfactorily in a combat mission role.

3308 Alternative Fuels

REFER ALSO TO CITATION(S) 47373

47902 (DOE/CE/50070—T16) DOE Synthetic Fuel Center monthly progress report No. 9, 1-30 July 1986. Sefer, N.R.; Erwin, J. (Southwest Research Inst., San Antonio, TX (USA). Fuels and Lubricants Research Div.). 10 Aug 1986. Contract AC01-84CE50070. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014165.

The mission of the Synthetic Fuel Center is to provide test quantities of special fuels to the research projects of the Alternative Fuels Utilization Program (AFUP). The fuels have met defined composition and property objectives or have conformed to assessments of future fuel composition. These fuels are produced from diverse sources including shale, coal, tar sands, and petroleum stocks and have included alcohols and vegetable oils. In the first three years of operation, the Center completed the laboratory and pilot plant, provided 26 fuels to 11 AFUP projects, and made two presentations of its work and five roundtable discussions.

36 MATERIALS

REFER ALSO TO CITATION(S) 47142, 47172

47903 (DOE/ER/45142—3) Very low temperature studies of hyperfine effects in metals. Weyhmann, W. (Minnesota Univ., Minneapolis (USA). School of Physics and Astronomy). Jul 1986. Contract FG02-84ER45142. 4p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013658.

Measurements on $ErRh_4B_4$ and $PrCu_6$ are underway. Progress on equipment is described. No hard data is given. (DLC)

47904 (MLM—3363) Slope formation in physical vapor deposited films when using mechanical masking techniques. Nesslage, G.V. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 25 Jun 1986. Contract AC04-76DP00053. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014265.

Physical vapor deposition of films through an opening in an obscuring body, such as a mechanical deposition mask, will demonstrate a distinct ramp at the edges of the deposit zone as defined by the mask opening. This ramp is a direct function of the size, shape, and location of the vapor source. Evaporation sources using electron beam guns result in minimum ramping; however, some does occur and must be considered in process development. This ramping is modeled in a simplified manner and discussed to provide some understanding of the considerations necessary for natural design limits, particularly in thicker films used in the preparation of some bridge wire devices by evaporation deposition techniques.

47905 (UCID—20832) Microstructural characterization of diamond-turned aluminum substrates of memory disks: effects of inclusions on the surface finish and tool wear. Syn, C.K. (Lawrence Livermore National Lab., CA (USA)). 31 Jul 1986. Contract W-7405-ENG-48. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014938.

Diamond-turned substrates of computer memory disks of Al-Mg alloys of 5086 and 5186 grades and a worn diamond tool usd in machining 5086 alloy were examined by means of optical and scanning electron microscopy. Detailed analysis of the examination results showed that the undesirable "orange peel" finish and accelerated tool wear that occurred in machining 5086 grade alloy disks could be traced to high inclusion content in the material. The iron-containing inclusion particles were shown to be detrimental to the tool life since they could chemically react with the tool material and induce machine tool chatter. The tool wear induced by the inclusion particles then contributed to the "orange peel" finish by creating an unevenly cut, rough surface on the disks.

3601 Metals And Alloys

REFER ALSO TO CITATION(S) 47320, 47491, 47494, 47497, 47499, 47500, 47514, 47515, 47518, 47518, 47518, 47579, 47580, 47581, 47583, 47584, 47585, 47586, 47587, 47588, 47590, 47591, 47598, 47598, 47623, 47623, 47624, 47625, 47628, 47628, 47704, 47896, 47972, 48047, 48048, 48048, 48076, 48167, 48193, 48193, 48291

47906 (AD-A—167403/5/XAB) Surface attack on metals in the presence of liquid metals. Final report. Beal, R.E. (Amalgamated Technologies, Inc., Scottsdale, AZ (USA)). 10 Apr 1986. 132p. NTIS, PC A07/MF A01.

A study was undertaken to evaluate liquid metals as electrical collectors in contact with solid metal alloys. Surface attack of the liquid metal on the solid metal is expected to be a major challenge to the development of a credible system. Low-melting-temperature metals and alloys of the fusible type are to be utilized for a collector that will operate in the 200-500 F range, with emphasis towards the lower end. Solid metals have been selected for experimental work based on their electrical properties and minimal potential reaction with the candidate liquid-metal alloys. Material properties of both liquid and solid metals were reviewed to identify initial material combinations for evaluation. Thorough literature searches were conducted to obtain as much pertinent physical-property and metallurgical data as possible, prior to actual experimental work. Process and material modelling was adopted to select candidate materials for both solids and liquids. Consideration of practical requirements for the eventual collectors is an integral part of the study. Work effort has concentrated on apparatus construction, evaluation and a program of testing to obtain screening data on materials selected and the chosen test method. Results have identified limitations of the test unit design and maximum current loads under test conditions with experimental current collectors. Candidate electrode materials have been exposed in low-melting fusible alloys for direct-dissolution data.

47907 (AERE-R—1816) Characterisation by Raman spectroscopy of oxide scales formed on a 20%Cr/25%Ni/niobium stabilised stainless steel. England, W.A.; Bennett, M.F.; Greenhaigh, D.A.; Jenny, S.N.; Knights, C.F. (UKAEA Atomic Energy Research Establishment, Harwell). May 1985. 20p. Issuing Activity.

Laser Raman Spectroscopy (LRS) was used to examine the composition of 0.3 to 2 micron thick scales formed on the 20%Cr/25%Ni/Nb (20/25/Nb) stabilized stainless steel during oxidation, at 600 to 950 C, in CO_2 and in CO_2 + 4%/CO + 350 vpm CH_4 + 300 vpm H_2. All the scales contained iron rich spinel oxides, except in carbon dioxide at 600 C, where Fe_2O_3 predominated. This difference was responsible for the greater attack of the 20/25/Nb stainless steel at 600 C in carbon dioxide than in the mixed gas environment. At 800 and up the spinel composition was modified by manganese incorporation and Cr_2O_3 was also a major constituent of the scales formed in both environments. The major scale constituents identified by LRS are both in accordance with thermodynamic predictions and understanding of scale development on the 20/25/Nb steel.

47908 (AERE-R—11829) Transition and upper shelf fracture toughness properties of an A508 Class 3 PWR nozzle cut-out. Druce, S.G.; Worth, J.H. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Physics and Metallurgy Div.). Jun 1985. 29p. H.M. Stationery Office, London, price Pound 5.00.

In this work the resistance to ductile and brittle fracture modes in an A508 Class 3 PWR nozzle cut-out has been examined using conventional fracture mechanics tests. Within the transition temperature regime considerable variability in toughness was found with some evidence that the near inside wall position was less tough then close to the outside wall. Cleavage fracture occurred at temperatures up to 60 C and a few data were below the ASME and lower bound reference toughness/temperature lines defined in the 1982 Light Water Reactor Study Group report on pressure vessel integrity. At 290 to 300 C specimen orientation significantly influenced tearing resistance but had little effect on initiation toughness. The observed orientation effects were consistent with an inclusion dominated fracture process. The levels of upper shelf toughness

were less than those previously found in a Japanese A508 forging, and similar to those of French A533B Class 1 plate produced about the same time. A comparison is made between the chemical analysis, tensile, Charpy impact, drop weight and fracture toughness properties of this forging and the appropriate ASME and Sizewell B specification.

47909 **(AERE-R—11962) Some fundamental studies of metal-induced embrittlement.** Trevena, P.; Lynch, S.P. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.; Aeronautical Research Labs., Melbourne (Australia)). Nov 1985. 22p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703155.

A study has been made of the effects of liquid alkali metal environments on the fracture behaviour of nickel, magnesium and single crystals of iron-silicon alloy. Liquid lithium and sodium environments were shown to promote embrittlement of one or more of the solid metals. Fractography revealed ductile dimpling, intergranular and transgranular fracture, the proportions of which varied with environment and test conditions. Liquid metal embrittlement (LME) of nickel and the iron silicon alloy showed remarkable fractographic similarities to hydrogen embrittlement (HE). LME of magnesium revealed features which are similar to fractures induced by stress corrosion cracking (SCC). It is therefore proposed that the mechanisms of LME, HE and SCC are similar in these cases. In addition, double cantilever beam (DCB) test specimens were used to investigate the effect of solid indium on sub-critical crack growth rates of 7017-T651 aluminium alloy.

47910 **(AERE-TP—1124) Mathematical model of crevice and pitting corrosion. Pt. 2. The mathematical solution.** Sharland, S.M. (UKAEA Atomic Energy Research Establishment, Harwell. Theoretical Physics Div.). Sep 1985. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703156.

The time-independent equations of mass transport governing the concentration of species and electrode potential within a corroding crevice or pit are solved using a number of mathematical approximations based on physical observations. A variety of analytic and numerical techniques is described and several methods which reduce computing time are developed. A simple method of time stepping is described for a calculation of the effect of precipitation of solid hydroxide in the crevice.

47911 **(BMFT-FB-T—86-032) Advanced development of diffusion bonding processes for joining of turbine blades and vanes with complex cooling configuration and other near net-shape components. Final report.** Steinhauser, L.; Adam, P. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 74p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752566.

Diffusionbonding, diffusionbrazing and diffusionwelding of nickelbase alloys had been developed and applied for joining of gas turbine parts and material test pieces. Alloys for single crystal blades are included. The investigations were completed with Ti6A14V and MA 6000-ODS-alloy. The report describes the results of the numerous tests of strength, non destructive testing, metallogaphy and of manufacturing technology aspects.

47912 **(BMI—1985-087) Materials analyses for the case of additive creep and fatigue - proposed calculation. Final report.** Kraegeloh, E.; Gaudig, W.; Hoffmann, M. (Bundesministerium des Innern, Bonn (Germany, F.R.); Staatliche Materialpruefungsanstalt, Stuttgart (Germany, F.R.)). Oct 1985. 68p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752599.

Schriftenreihe Reaktorsicherheit und Strahlenschutz. Ergebnisberichte, Untersuchungen, Studien, Gutachten.

The principles of strength computation are described. The combination of creep together with alternating stress has only been taken into consideration since high-strength materials were introduced. A summarizing evaluation of creep fatigue is given in annex 1. Primary creep with transients is shown using a simplified numerical example. Another annex shows a critical view on the Oak Ridge model of inelastic analysis.

47913 **(BMI/ONWI—611) ERG review of waste package container materials selection and corrosion.** Moak, D.P.; Perrin, J.S. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jul 1986. Contract AC02-83CH10140. 30p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86015009.

The Engineering Review Group (ERG) was established by the Office of Nuclear Waste Isolation (ONWI) to help evaluate engineering-related issues in the US Department of Energy's nuclear waste repository program. The October 1984 meeting of the ERG reviewed the waste package container materials selection and corrosion. This report documents the ERG's comments and recommendations on these subjects and the ONWI response to the specific points raised by the ERG.

47914 **(BNL—38329) Antiferromagnetic spin fluctuations and the heavy fermion system UPt_3.** Goldman, A.I.; Shirane, G.; Aeppli, G.; Bucher, E.; Hufnagl, J. (Brookhaven National Lab., Upton, NY (USA); Bell Labs., Murray Hill, NJ (USA); Konstanz Univ. (Germany, F.R.)). 1986. Contract AC02-76CH00016. 11p. (CONF-860746—3). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014125.

From Anomalous rare earths and actinides; Grenoble, France (7 Jul 1986).

We review the results of inelastic polarized and unpolarized magnetic neutron scattering measurements on the heavy fermion superconductor UPt_3. Below T/sub chi/ = 18K, we find evidence for antiferromagnetic spin fluctuations with a modulation vector along the c-axis of the hexagonal lattice. This contradicts the analogy often made between UPt_3 and liquid ^3He, and may have important consequences for the pairing mechanism responsible for superconductivity in this system.

47915 **(CONF-860602—6) ^{57}Fe Mossbauer spectroscopy of U_6Fe.** Lemon, G.; Boolchand, P.; Stevens, M.; DeLong, L.E.; Huber, J.G.; Marcuso, M. (Cincinnati Univ., OH (USA). Dept. of Physics; Kentucky Univ., Lexington (USA). Dept. of Physics and Astronomy). Apr 1986. Contract W-31-109-ENG-38. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014536.

From 17. rare earth research conference; Hamilton, Ontario, Canada (8 Jun 1986).

Samples of U_6Fe were prepared by arc melting U and enriched ^{57}Fe. The samples display superconducting transitions which are sensitive to long-term exposure to air. Room temperature spectra of U_6Fe typically display a majority site A (quadrupole splitting $\Delta = 0.749(3)$ mm/s, isomer shift $\delta = 0.482(6)$ mm/s relative to Cu) and a minority site B ($\Delta = 0.55(3)$ mm/s, $\sigma = 0.12(3)$ mm/s) with the site intensity ratio (I/sub B//I/sub A/) typically 0.05 to 0.10. The I/sub B//I/sub A/ intensity ratio increases upon air exposure of the samples. We have studied Moessbauer spectra as a function of temperature T in the range $15°K \leq T \leq 310°K$ paying particular attention to the T-variation of the isomer-shift and recoil-free-fraction of the majority site A. Results indicate a consistent softening of lattice vibrations of U_6Fe at $T \simeq 170°K$.

47916 **(CONF-860605—19) Radiation-induced segregation in Cu-Au alloys.** Hashimoto, T.; Rehn, L.E.; Okamoto, P.R. (Argonne National Lab., IL (USA). Materials Science and Technology Div.; Hitachi Ltd., Ibaraki (Japan). Energy Research Lab.). Apr 1986. Contract W-31-109-ENG-38. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014492.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

Radiation-induced segregation in a Cu-1 at. % Au alloy was investigated using in situ Rutherford Backscattering Spectrometry. Irradiation with 1.8-MeV He produced nonequilibrium Au atom depletion in the near surface region. The amount of segregation was measured as a function of dose, dose rate and temperature. Segregation was observed between 300 and 500°C. For a calculated dose rate of 3.9×10^{-3} dpa/s, the radiation-induced segregation rate peaked near 400°C. Theoretical analysis based on the Johnson-Lam model predicted that the amount of segregation would be directly proportional to dose at the early stage of irradiation, would deviate from linearity with a continuously decreasing slope at intermediate

doses, and finally approach a constant value after high doses. The analysis also predicted that the segregation rate would vary as the -1/4th power of the dose rate at constant dose in the low temperature region. These predictions were all verified experimentally. A procedure for extracting relative defect production efficiencies from similar measurements is discussed.

47917 **(CONF-860605—20) Phase transformations in neutron-irradiated Zircaloys.** Chung, H.M. (Argonne National Lab., IL (USA). Materials Science and Technology Div.). Apr 1986. Contract W-31-109-ENG-38. 38p. NTIS, PC A02/MF A01 - GPO. File Number TI86014487.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

Microstructural evolution in Zircaloy-2 and -4 spent-fuel cladding specimens after ~3 years of irradiation in commercial power reactors has been investigated by TEM and HVEM. Two kinds of precipitates induced by the fast-neutron irradiation in the reactors have been identified, i.e., Zr_3O and cubic-ZrO_2 particles approximately 2 to 10 nm in size. By means of a weak-beam dark-field "2-1/2D-microscopy" technique, the bulk nature of the precipitates and the surficial nature of artifact oxide and hydride phases could be discerned. The Zr(Fe/sub x/,Cr/sub 1-x/)$_2$ and Zr_3(Fe/sub x/,Ni/sub 1-x/) intermetallic precipitates normally present in the as-fabricated material virtually dissolved in the spent-fuel cladding specimens after a fast-neutron fluence of ~4 x 10^{21} ncm^{-2} in the power reactors. The observed radiation-induced phase transformations are compared with predictions based on the currently available understanding of the alloy characteristics. 29 refs.

47918 **(CONF-860605—21) Cascade defect production and irradiation enhanced diffusion in Cu_3Au.** Kirk, M.A.; Funk, L.L. (Argonne National Lab., IL (USA)). Mar 1986. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014531.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

By using the ordering alloy Cu_3Au and measuring resistivity changes during and following fast-neutron irradiations at IPNS, we have studied cascade defect production and irradiation enhanced diffusion between 10 and 460°K. Ordering and disordering rates were measured as functions of irradiation temperature, neutron dose, neutron dose rate, time following cessation of flux, and step annealing. Free and clustered vacancy production was observed. The temperature dependence of the production of total migrating vacancy concentrations was determined. Vacancy sink production was linear with neutron dose and is compared with recent transmission electron microscopy experiments on the production of dislocation loops in this alloy. Time dependent and quasi-steady state vacancy concentrations were measured and compared with solutions of reaction rate equations for irradiation enhanced diffusion. The influence of recombination of vacancies with interstitials is observed at low sink concentrations (low neutron doses).

47919 **(CONF-860605—22) Collapse of defect cascades to dislocation loops in Cu_3Au.** Black, T.J.; Jenkins, M.L.; English, C.A.; Kirk, M.A. (Argonne National Lab., IL (USA). Materials Science and Technology Div.; Oxford Univ. (UK); UKAEA Atomic Energy Research Establishment, Harwell). Feb 1986. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014529.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

TEM and ordered Cu_3Au were employed to measure the probability of dislocation loop formation as functions of irradiating ion mass (Ar^+, Cu^+ and Kr^+), energy (50 and 100 keV), and irradiation temperature (30 and 300°K). Disordered zones were produced at every defect cascade site and imaged in dark-field superlattice reflections. Dislocation loops were imaged in fundamental reflections in the same sample areas to produce an accurate measurement of the probability of the collapse of each cascade to a dislocation loop, within a large set (~200) of defect cascades for each irradiation condition. The size distributions of dislocation loops and disordered zones were also measured. Defect cascades collapse to dislocation loops with significant probability (~0.5) even at 30°K. Other observations include an increasing collapse probability with increasing cascade energy density (increasing ion mass) and with increasing sample irradiation temperature. However, no additional collapse was observed upon annealing from 30 to 300°K, and no increase in collapse probability was observed upon increasing the bombarding ion energy from 50 to 100 keV. Disordered zone sizes also increased with increasing ion mass and with increasing sample irradiation temperature (30 to 300°K).

47920 **(CONF-860605—23) Collapse of defect cascades to dislocation loops during self-ion irradiations of Fe, Ni and Cu at 30, 300 and 600°K.** Kirk, M.A.; Robertson, I.M.; Vetrano, J.S.; Jenkins, M.L.; Funk, L.L. (Argonne National Lab., IL (USA). Materials Science and Technology Div.; Illinois Univ., Urbana (USA); Oxford Univ. (UK)). Feb 1986. Contract AC02-76ER01198;W-31-109-ENG-38. 24p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014530.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

The formation of dislocation loops by self-ion irradiations of Fe, Ni and Cu has been studied in situ in the ANL High-Voltage Electron Microscope as functions of ion dose and irradiation temperature. At low doses ($\leq 10^{13}$ ions/cm^2) at room temperature individual cascades were observed to collapse to vacancy dislocation loops in Cu with high probability, in Ni with lower probability, and in Fe with zero probability. Cascade collapse was observed at low doses at 30°K in Cu and Ni, but at rates less than their respective rates at room temperature. A loop formation rate for Ni at 600°K is also reported. At higher doses ($>10^{13}$ ions/cm^2) where overlap of cascades becomes significant, loops were first observed in Fe and with a supra-linear build-up with dose. Also at higher doses a decrease in loop production rate in Cu and Ni was observed due to loop coalescence. The materials and temperature dependence of cascade collapse probabilities are suggested to be related to thermal spike mechanisms during the cascade formation lifetime.

47921 **(CONF-860605—24) Fine scale microstructure in cast and aged duplex stainless steels investigated by small angle neutron scattering.** Epperson, J.E.; Lin, J.S.; Spooner, S. (Argonne National Lab., IL (USA). Materials Science and Technology Div.; Oak Ridge National Lab., TN (USA). Solid State Div.). Feb 1986. Contract AC05-84OR21400;W-31-109-ENG-38. 44p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014499.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

Small angle neutron scattering (SANS) allows clustering phenomena to be studied in systems for which the constituent atoms do not differ greatly in atomic number. This investigation used SANS to characterize the fine scale microstructure in two cast and aged duplex stainless steels; aging times extended up to eight years. The steels differed in ferrite content by about a factor of two. The scattering at lowest q was dominated by magnetic scattering effects associated with the ferrite phase. In the range $0.025 \leq q \leq 0.2A^{-1}$, additional scattering due to a precipitating phase rich in Ni and Si was observed. This scattering was rather intense and revealed a volume fraction of precipitate, in the ferrite, estimated to be 12 to 18% after long time aging. After about 70,000 hours at 400°C, there were about 10^{18} precipitate particles per cm^3 some 50A in mean diameter, and they were distributed in a nonrandom manner, i.e., spatially, short-range-ordered. This investigation suggests that after aging some 70,000 hours at 400°C, the precipitate in the ferrite phase is undergoing Ostwald ripening. The present data are insufficient to indicate at what time this ripening process began.

47922 **(CONF-860752—1) Microstructural characterization of primary coolant pipe steel.** Miller, M.K.; Bentley, J. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012631.

From 33. international field emission symposium (IFES); Berlin, F.R. Germany (6 Jul 1986).

Atom probe field-ion microscopy, analytical electron microscopy, and optical microscopy have been used to investigate the changes that occur in the microstructure of cast CF 8 primary coolant pipe stainless steel after long term thermal aging. The cast duplex microstructure consisted of austenite with 15% δ-ferrite. In-

vestigation of the aged material revealed that the ferrite spinodally decomposed into a fine scaled network of α and α'. A fine G-phase precipitate was also observed in the ferrite. The observed degradation in mechanical properties is probably a consequence of the spinodal decomposition in the ferrite.

47923 **(CONF-8604103—2) Precipitation and phase stability of solid Kr in cavities after room-temperature implantation of Al. Revision.** Birtcher, R.C.; Jaeger, W. (Argonne National Lab., IL (USA). Materials Science and Technology Div.; Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)). Jun 1986. Contract W-31109-ENG-38. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014572.

From Conference on frontiers of electron microscopy in materials science; Argonne, IL, USA (21 Apr 1986).

Microstructural changes and the precipitation of Kr in thin (~70 nm) films of Al during 65 keV Kr^+ ion implantation at room temperature have been studied with Transmission Electron Microscopy (TEM), thermal desorption spectroscopy, and Rutherford backscattering. For fluences below 2 x 10^{19} Kr^+m^{-2}, isolated dislocation loops were observed to evolve into a dislocation network. Above fluences of 2 x 10^{19} Kr^+m^{-2}, the microstructure is dominated by a high density of cavities whose average size increases with fluence. The appearance of additional electron diffraction reflections indicates that the cavities contain solid fcc Kr that is epitaxially aligned with the fcc Al matrix. Above fluences of 2 x 10^{20} Kr^+m^{-2}, an increasing fraction of the Kr within larger cavities is in a fluid phase. The thermal stability of the microstructure and the phase stability of solid Kr, in cavities, was investigated up to 910°K by in situ TEM annealing experiments and by insitu thermal cycling between ~90 and 300°K. Melting and solidification of Kr in cavities was observed and compared to the melting curve for bulk solid Kr.

47924 **(CONF-8609101—1) Microstructural modifications during laser and electron beam welding.** David, S.A.; Vitek, J.M. (Oak Ridge National Lab., TN (USA). Metals and Ceramics Div.). 1986. Contract AC05-84OR21400. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011076.

From International conference on power beam technology; Brighton, UK (10 Sep 1986).

Extensive microstructural modifications occur during laser and electron beam welding of various alloys. For austenitic stainless steels, most welds that do not hot crack contain a duplex austenite plus ferrite microstructure when welded by conventional welding processes. However, during laser welding at high speeds, fully austenitic or ferritic microstructures can be obtained in this class of material. The observed modifications in microstructures will be explained in terms of changes in the mode of solidification and also a retardation of solid state transformation. Laser and electron beam welding processes have been successfully used to weld iridium alloys, which are difficult to weld by conventional welding processes. During welding, these alloys have been found to be prone to severe hot cracking. The cracking is influenced to a great extent by the fusion zone microstructure and composition. The successful laser and electron beam welding of these alloys is attributable to the highly concentrated heat source available, precise control of the heat input, and the refinement in fusion-zone microstructure obtained. The refinement in the fusion-zone microstructure and hence the reduction in hot-cracking tendency of these alloys are discussed in terms of the puddle shapes and grain growth during laser or electron beam welding.

47925 **(DOE/ER/45182—2) Detecting and monitoring crack growth in austenitic and ferritic steels. Progress report, 1 December 1985-30 November 1986.** Carpenter, S.H. (Denver Univ., CO (USA). Dept. of Physics). Jul 1986. Contract FG02-85ER45182. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014348.

The program has been mainly concerned with the use of acoustic emission measurements and signal analysis to detect, monitor and identify the mode of crack growth. Treatments have been developed which produce four distinct and different modes of crack growth in 304 stainless steel. The acoustic emission has been measured from each of these four types of crack growth using cantliver speciments. The waveforms have been recorded and careful analysis is underway to characterize the emissions. It appears that it will be possible to identify the mode of crack growth from characteristics of the measured acoustic emissions.

47926 **(EPRI-CS—4666) Dissimilar-weld failure analysis and development. Comparative behavior of similar and dissimilar welds. Final report.** Busboom, H.; Ring, P.J. (General Electric Co., Sunnyvale, CA (USA). Nuclear Systems Technology Group). Jul 1986. 51p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920418.

The 593°C (1100°F) stress rupture behavior of similar metal welds (SMWs) and dissimilar metal welds (DMWs) was investigated under cyclic load and cyclic temperature conditions to provide insight into the question, "Why do DMWs fail sooner than SMWs in the fossil fuel boilers." The weld joints of interest were an all ferritic steel SMW made by fusion welding 2-1/4Cr-1Mo to 2-1/4Cr-1Mo using 2-1/4Cr-1Mo filler metal and an austenitic to ferritic steel DMW made by fusion welding Alloy-800H to 2-1/4Cr-1Mo using a nickel base filler metal ERNiCr-3. The stress rupture behavior obtained on cross weld specimens was similar for both types of welds with only a 20% reduction in rupture life for the DMW. For rupture times less than 1500 hours, failures occurred in the 2-1/4Cr-1Mo base metal whereas, for rupture times greater than 1500 hours, failures occurred in the 2-1/4Cr-1Mo heat affected zone (HAZ). The HAZ failures exhibited a more brittle appearance than the base metal failures for both types of welds and it appears that the life of both joints was limited by the stress rupture properties of the HAZ. These results support the hypothesis that increased residual stresses due to abrupt changes in hardness (strength) of metals involved are the major contributors to the reduction in life of DMWs as compared to SMWs. 10 refs., 15 figs., 7 tabs.

47927 **(EPRI-CS—4688) Remaining-life estimation of boiler pressure parts: crack growth studies. Final report.** Liaw, P.K.; Saxena, A. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Materials Analysis Dept.; Georgia Inst. of Tech., Atlanta (USA). Fracture and Fatigue Research Lab.). Jul 1986. 119p. Reserach Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920416.

A methodology for predicting the remaining creep crack growth life in boiler thick section components has been developed. The creep crack growth behavior of a 1-1/4Cr-1/2Mo header material can be characterized by the C/sub t/ parameter over a wide range of crack growth rates and under conditions ranging from small-scale to large-scale creep. Limited finite-element results show that C/sub t/, as measured at the loading pins of test specimens, can be used as a measure of the crack tip stress field in the nonsteady-state creep regime. This may be the reason that C/sub t/ characterizes creep crack growth behavior. The experimentally measured values of C/sub t/ in compact-type specimens compared well with those obtained from the general analytical equations developed in this program. Analytical equations have been formulated for estimating C/sub t/ in structural components. The creep deformation rates and the creep crack growth rates of the material machines from the hot region of the header were found to be greater than those from the cold region. Varying the specimen diameter from 1.98 to 12.83 mm did not affect creep deformation and rupture data. The developed life prediction methodology is demonstrated by using two hypothetical examples of a cracked header-like component and an elevated-temperature steam pipe. 39 refs., 49 figs., 11 tabs.

47928 **(EPRI-CS—4727) Microstructure and texture effects on titanium alloys.** Luetjering, G. (Technische Univ. Hamburg-Harburg (Germany, F.R.). Bereich Metallkunde und Werkstofftechnik). Aug 1986. 67p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920419.

In support of EPRI's interest in titanium alloy blading for low pressure steam turbines, the Technical University of Hamburg-Harburg has been studying the effects of microstructure and texture of the mechanical properties of a titanim alloy Ti-6A-4V that are important in the low pressure blade applications. These studies are presented in the form of technical papers on the following topics: (1) fatigue; (2) mean stress; (3) shot peening; (4) notch effects; (5)

fatigue crack propagation; (6) fracture toughness; (7) structure-property correlation. These papers have appeared individually in the technical literature, but are collected here in a single report to facilitate their use in L.P. steam turbine applications. All papers have been processed for inclusion in the Energy Data Base.

47929 **(EPRI-EM—4568) Electroforming of metals: state-of-the-art assessment. Final report.** Fiorentino, R.J. (Battelle Columbus Div., OH (USA)). Jul 1986. 44p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920402.

An assessment of the state-of-the-art of electromagnetic and electrohydraulic forming of metal parts has been conducted. Electromagnetic forming (EMF) shapes parts by a force resulting from a high-density magnetic field. The electrohydraulic forming (EHF) process differs in that the force is applied to parts from a shock wave emanating from a point within a fluid medium. Both processes are used to form relatively thin-section hollow or flat products. This survey has found that, of the two electrotechnologies, the electromagnetic forming process is expected to be used increasingly in a broad range of industries, particularly for automotive, aircraft, and electrical-cable components. In contrast, the level of applications for the electrohydraulic forming method is expected to remain essentially unchanged over the near- and long-term period. This is because its use is restricted to relatively unusual part shapes in industries that do not require large unit quantities. It is expected that the electricity consumption of the EMF process will increase to levels of 25 and 100 million kWh in 1990 and 2000, respectively. The electricity consumption of the EHF process, however, is negligible by comparison (probably less than 10 percent of that for EMF today) and no future growth is expected.

47930 **(EPRI-RD—4649-Vol.1) Effects of dynamic strain on crack tip chemistry. Volume 1. Tests using a segmented artificial crevice. Final report.** Parkins, R.N.; Liu, Y. (Newcastle upon Tyne Univ. (UK). Dept. of Metallurgy and Engineering Materials). Jun 1986. 98p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI86920438.

Work was done on potential, current and solution composition changes along stress corrosion cracks in a NiCrMoV steel in NaOH solutions and in type 304 stainless steel in NaCl solutions. Surfaces of the steels were exposed to the relevant solution in a creviced situation simulating a crack, the dynamically straining tip of which was simulated by a tensile specimen located at the remote end of the crack. With the 304 stainless steel in dilute chloride solutions, large potential gradients can persist along simulated cracks. Depending upon the solution composition and applied potential, large changes in the pH of the enclave solution can occur and these can be enhanced in the vicinity of the straining tensile specimen simulating the crack tip. Pitting, with associated chloride ion concentration changes, can occur on the simulated crack sides, but opening and closing the crack, to displace about 80% of the enclave solution, had little effect upon the potential distribution.

47931 **(EUR—10033-FR) Corrosion resistance of nickel and some nickel base alloys in water electrolyzers working at 200°C. Final report.** Combrade, P. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1985. 90p. (In French). Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

Energie.

The aim of this program was to check the corrosion resistance of Nickel 200, 201 and several nickel base alloys (600, Monel 400) in conditions typical of anolyte circuits in electrolyzers working at 200 or 160°C. A particular emphasis was given to the effect of welding on the corrosion properties. The anolytes were simulated with 40% KOH solutions with oxygen partial pressure from 2 to 18 bar. Conventional exposure tests including welded coupons were performend as well as electrochemical measurements and exposure tests under electrochemical control.

47932 **(FhG-W—8/85) Development of a thermomechanical measuring procedure for characterizing the material behaviour at fast, ductile fracture.** Klemm, W.; Winkler, S.; Beinert, J. (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Freiburg im Breisgau (Germany, F.R.). Inst. fuer Werkstoffmechanik). Aug 1985. 143p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752674.

A novel measuring procedure has been developed for measuring the resistance of materials against fast ductile crack propagation. This new material strength value, denoted crack propagation energy, characterizes the energy concentration during crack propagation. It is determined via a measurement of the related heat production. With laboratory test specimens made from the steels X65 and X70, crack propagation energies have been measured for crack velocities being comparable to those observed in full scale line pipe tests. A comparison of the measured crack propagation energies with conventional material strength values indicates, that the characterization of the material by the crack propagation energy is superior to the characterization by the impact energy measured with notched bends specimens for example. The crack propagation energy represents an appropriate characterization of the resistance of high toughness materials at ductile fracture conditions. 39 refs., 10 tabs., 116 figs.

47933 **(FRNC-TH—2127) Uranium magnetism in UGa_2 and $U(Ga_{sub}(1-x)Al_{sub}(x))_2$ compounds.** Ballou, R. (Grenoble-1 Univ., 38 - La Tronche (France); Institut National Polytechnique, 38 - Grenoble (France)). 1983. 85p. (In French). NTIS (US Sales Only), PC A05/MF A01. File Number DE86750854.

Magnetism of intermetallic compounds of uranium is studied. A monocrystal of the highly anisotropic ferromagnetic material UGa_2 is studied by polarized neutron diffraction. Localisation of 5f electrons is evidenced. Magnetic structure of uranium in UGa_2 is determined. The pseudobinary compound $U(Ga_{sub}(1-x)Al_{sub}(x))_2$ is studied for crystal structure, ferromagnetism, paramagnetism, specific heat and resistivity.

47934 **(GTFR—65) Sputtering/redeposition analysis of alkali-based tungsten composites for limiter/divertor applications.** DeWald, A.B.; Krauss, A.R.; Gruen, D.M.; Valentine, M.G. (Corium Industries, Inc., Atlanta, GA (USA); Argonne National Lab., IL (USA); Georgia Inst. of Tech., Atlanta (USA). Fusion Research Center). Jul 1986. Contract AS05-78ET52025. 19p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014754.

Composites of porous tungsten infiltrated with alkali metal-bearing alloys have been projected as a means of reducing plasma impurities and sputter erosion in magnetic fusion devices. Self-sustaining alkali metal overlayers have been observed to inhibit erosion of the underlying structural substrate by 2X to 10X. The alkali metal itself, insofar as it sputters as a secondary ion, is trapped at the surface by sheath potential and tangential magnetic fields. Self-regeneration of the alkali metal coating is obtained by thermal and radiation-induced segregation from the bulk.

47935 **(HEDL-SA—3423-FP) In-reactor creep behavior of the fusion heats of HT9 and modified 9Cr-1Mo.** Puigh, R.J. (Hanford Engineering Development Lab., Richland, WA (USA)). Oct 1985. Contract AC06-76FF02170. 21p. (CONF-860421—59). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014759.

From 2. international conference on fusion reactor materials (ICFRM-2); Chicago, IL, USA (13 Apr 1986).

In-reactor creep data on the fusion heats of HT9 and 9Cr-1Mo have been obtained to a peak fluence of 10×10^{22} n/cm^2 (E > 0.1 MeV). No evidence for swelling was observed. The in-reactor creep strains for both alloys were similar and consistent with in-reactor creep data on the similar alloys irradiated in EBR-II or FFTF. The ferritic heats continue to exhibit superior creep resistance when compared to 316 SS and the PCA alloy for irradiation temperature less than 520°C.

47936 (INIS-mf—10145, pp 38-47) **Some theoretical and experimental aspects of assessing corrosion fatigue of metals.** Valenta, J. (Statni Vyzkumny Ustav pro Stavbu Stroju, Bechovice, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The rate of propagation of corrosion fatigue cracks results from the presence of the aggressive medium and from the synergic effects of cyclic load. The propagation of the fatigue crack under the corrosive medium is modelled by a change of constants in Paris' relationship. The variation of crack propagation rate with the amplitude of the change in the factor of stress intensity is given in diagrams. In austenitic steels of the 18-8 type, it was proved that there exists a threshold temperature of 130 deg C of very pure water under which there is no intergranular stress corrosion cracking. Intergranular stress corrosion cracking has also been indicated in case maximum stress in the cycle is below the yield point if the temperature of the water was 288 deg C. The rate of growth of the corrosion crack in very pure water is approximately by 1.5 orders higher than at room temperature and in the air. The increase in growth rate of the defect when simulating the chemical composition of water in a nuclear power plant, is relatively low. Algorithms have been processed for determining the service life of fast reactor steam generator pipes. A diagram is given representing the test loop which allows to experimentally identify the required characteristics of materials.

47937 (INIS-mf—10145, pp 48-54) **Experimental approach to the study of the effect of sodium on long-term properties.** Walder, V.; Dufek, F.; Prnka, T. (Vyzkumny Ustav Hutnictvi Zeleza, Dobra, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

A special testing equipment was developed for studying the effects of superimposition of mechanical stress and the effect of liquid sodium at high temperatures on structural materials for nuclear power plants. The equipment consists of a dynamic two-circuit sodium loop with a temperature gradient in the main circuit and with forced sodium flow. It comprises a main circuit with the experimental section and with an absorber of corrosion products, and an auxiliary purification circuit with a cold trap. The circuits have a common storage tank, argon economy and vacuum system. The temperature difference between the test pieces and the absorber of corrosion products is at least 100 deg C. The test section consists of six series-connected containers into which test samples of the material are inserted. A diagram is given of the testing equipment and the variation of temperature, velocity and size of active surface along the whole main circuit is shown.

47938 (INIS-mf—10145, pp 71-79) **Effect of long-term operating exposure to sodium and steam-water mixture on creep strength and fatigue properties.** Bina, V.; Douda, J.; Kneifl, M. (Statni Vyzkumny Ustav Materialu, Prague, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

With regard to the manufacture of fast reactor steam generators the following materials were tested: Cr20Ni35Ti (S31), Cr18Ni11 (3R12) and Cr2.25Mo1Nb (HT8X6). Mechanical properties are adequate to values of non-exposed steels. Creep tests showed that at operating temperatures of up to 500 deg C no changes appeared in the refractory properties due to the effects of sodium or the water/steam mixture. The plastic properties (ductility) remained unchanged. Tests of the effect of the water/steam mixture on fatigue showed in Cr2.25Mo1Nb steel a decrease by one order of resistance to high cycle fatigue. This was caused by local corrosion of tubes. For an undisturbed internal surface with compact magnetite layer, the fatigue properties of tubes remained unchanged. Cracks near to the surface have a mixed character with prevalence of intergranular failure.

47939 (INIS-mf—10145, pp 133-144) **Properties of long-term operated welded joints.** Pilous, V. (Vysoka Skola Strojni a Elektrotechnicka, Plzen, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The causes are investigated of cracks under overlays in the heat affected zone of medium alloy Cr-Ni-Mo-V steels. Cracks develop in submerged arc welding with austenitic strip electrodes at a high heat input. At high temperatures 1250 - 1430 deg C, grains in the overheated zone adjoining the austenitic overlay become coarse. Cracks are intergranular, along the original austenitic grains, with smooth intergranular facets. A test was made of simulating cycles of welding and annealing. The samples were heated to a temperature of 1350 deg C for 30 s and subsequently cooled for 30 s to a temperature of 100 - 20 deg C. At constant stress lower than threshold stress and at critical temperature of 500 - 800 deg C no overlay cracks appeared. Also simulated was the consequence of a 5000 h dwell in an operating temperature of 325 deg C. Under cyclic stress the service life of material in the overlay and in the joints with basic material decreased by 5 - 15%. The austenitic overlay showed greater resistance to plastic deformation. Owing to carburization of the boundary of the overlay and basic material, crack propagation in that zone slowed down, in some instances ceased completely.

47940 (INIS-mf—10145, pp 23-30) **Thermodynamics and diffusion processes in the Fe-Ni-Cr system.** Million, B.; Vrestal, J. (Ceskoslovenska Akademie Ved, Brno. Ustav Fyzikalni Metalurgie). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The instance is considered when austenitic steel of the Fe-C-Cr-Ni type comes in contact with flowing liquid sodium at temperatures of 500 - 600 deg C. The self-diffusion coefficients of components were measured for this ternary system. The self-diffusion coefficients increase with iron content increasing from 0 to 15% and decline at an iron content of more than 35%. The ratio of self-diffusion coefficients of the individual components is constant for the entire studied temperature and concentration interval. Using determinations of thermodynamic activities in the binary systems Fe-Ni, Fe-Cr and Ni-Cr it is possible to assess the regrouping of elements in austenitic steels and thereby to estimate the possible long-term changes in the mechanical properties of these materials.

47941 **(INIS-mf—10145) Long-term mechanical properties of steels under effect of corrosive medium. Seminar.** (Vyzkumny Ustav Hutnictvi Zeleza, Dobra (Czechoslovakia)). 1984. 114p. (In Czech). (CONF-8409354—). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157.

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

At the seminar held in Visalaje (Czechoslovakia) in September 1984, the participants heard 19 papers of which 13 have been inputted in INIS. They deal with the problems of thermodynamics and of diffusion in austenitic steels, of corrosion fatigue of metals, structural materials for fast reactor steam generators, of resistance and service life of structural materials, especially in the liquid sodium medium, and of the properties of welded joints and their effect on resistance to long-term stress.

47942 (INIS-mf—10145, pp 3-12) **Selected physical and metallurgical characteristics of austenitic stainless steels used in nuclear power engineering.** Mazanec, K. (Vysoka Skola Banska, Ostrava, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The susceptibility of CrNi austenitic steels to the development of intergranular corrosion cracking is evaluated. Intergranular corrosion develops in dependence on carbon content after annealing at temperatures of 500 - 800 deg C. An important role is played by impurities in the steel. They may modify the rate of corrosion or passivation or influence the C-Cr balance at the grain boundaries, which leads to changes in kinetics and in thermodynamic parameters of the precipitation of chromium carbides. Intergranular defects have also been found during the development of what are called warm cracks in the weld metal which are related to the segregation of phosphorus and sulfur. Methods are indicated of controlling the microsegregation processes of various additions and of eliminating the effects of annealing and other metallurgical parameters on the said processes.

47943 (INIS-mf—10145, pp 120-124) **Effect of reactor environment on embrittlement of Cr-Mo-V steel.** Splichal, K.; Axamit, R.; Otruba, J.; Koutsky, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1984. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703157. (CONF-8409354—).

From Seminar on long-term mechanical properties of steels under effect of corrosive medium; Visalaje, Czechoslovakia (26 Sep 1984).

The effects are studied of neutron radiation, applied strain and corrosion medium on the propagation of corrosion cracks in the materials of PWR pressure vessels. Tested were low alloy steels Cr-Mo-V and Cr-Ni-Mo-V. Tensile properties were tested on cylindrical samples with the diameter d=4 mm at the deformation rate $8.3 \times 10^{-4}\ s^{-1}$. Cylindrical samples with a 60 deg V notch, diameters $d_1=3.5$ mm, $d_3=5$ mm, l=17.5 mm and notch radius 0.5 mm were tested at constant load. Irradiation was carried out on the WWR-S reactor with neutron fluence 2.6 to 4.9 x 10^{23} $n.m^{-2}$ (E>0.5 MeV) at temperatures 130, 180 and 290 deg C. Irradiated and non-irradiated samples were charged with hydrogen in 1N H_2SO_4 for one hour before the test. The experiment determined the value of threshold stress under which samples of steel are not disturbed even at high current densities: for Cr-Mo-V steel, this is 210 MPa, for Cr-Ni-Mo-V it is 410 MPa. The susceptibility of unirradiated steel to hydrogen embrittlement following hydrogen charging occurs at a hydrogen content of over 2.5 ppm. The effect of radiation embrittlement on hydrogen embrittlement is indirectly proportional to the irradiation temperature. Hydrogen charging of samples irradiated at 130 and 180 deg C with a fluence greater than 2.6×10^{23} $n.m^{-2}$ leads to the superposition of hydrogen and radiation embrittlement thereby often resulting in total loss of plasticity.

47944 (JAERI-M—85-053) **Influence of heating rate on corrosion behavior of Ni-base heat resistant alloys in simulated VHTR helium environment.** Kurata, Yuji; Kondo, Tatsuo. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Apr 1985. 39p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. File Number DE86703158.

The influence of heating rate on corrosion and carbon transfer was studied for Ni-base heat resistant alloys exposed to simulated VHTR(very high temperature reactor) coolant environment. Special attention was focused to relationship between oxidation and carburization at early stage of exposure. Tests were conducted on two heats of Hastelloy XR with different boron(B) content and the developmental alloys, 113MA and KSN. Two kinds of heating rates, i.e. 80 °C/min and 2 °C/min, were employed. Corrosion tests were carried out at 900 °C up to 500 h in JAERI Type B helium, one of the simulated VHTR primary coolant specifications. Under higher heating rate, oxidation resistance of both heats of Hastelloy XR (2.8 ppmB and 40 ppmB) were equivalent and among the best, then KSN and 113MA followed in that order. Under lower heating rate only alloy, i.e. Hastelloy XR with 2.8 ppmB, showed some deteriorated oxidation resistance while all others were unaffected by the heating rate. On the other hand the carbon transfer behavior showed strong dependence on the heating rate. In case of higher heating rate, significant carburization occurred at early stage of exposure and thereafter the progress of carburization was slow in all the alloys. On the other hand only slow carburization was the case throughout the exposure in case of lower heating rate. The carburization in VHTR helium environment was interpreted as to be affected by oxide film formation in the early stage of exposure. The carbon pick-up was largest in Hastelloy XR with 40 ppmB and it was followed by Hastelloy XR with 2.8 ppmB. 113MA and KSN were carburized only slightly. The observed difference of carbon pick-up among the alloys tested was interpreted to be attributed mainly to the difference of the carbon activity, the carbide precipitation characteristics among the alloys tested.

47945 (Juel—2006) **Determination of the acoustical phonon dispersion branches of $CePd_3$ by inelastic neutron diffraction.** Severing, A. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung). Jul 1985. 117p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752600.

The result of this thesis is, that the phonon dispersion of $CePd_3$, measured by inelastic neutron scattering, does not show any phonon softening effects due to valence fluctuations as it is observed in the phonon dispersion spectra of TmSe, SmS under pressure and SMsub(.75)Ysub(.25)S in dependence of the temperature. Even at low temperature no softening effects could be detected in comparison to the room temperature data. However we see indications for the existence of intermediate valence induced electron-phonon couplings in the linewidth of the longitudinal acoustic phonon in <111>-direction with reduced wavevector xi=0.2. This phonon seems to be broadened at 135 K. If this broadening is a real intermediate valence effect, this effects manifest themselves much weaker in $CePd_3$ than in the substances with NaCl-structure. The question whether such couplings realy exist can only be answered by further measurements.

47946 (LA—10753-T) **Attenuation of shock waves in copper and stainless steel.** Harvey, W.B. (Los Alamos National Lab., NM (USA)). Jun 1986. Contract W-7405-ENG-36. 487p. NTIS, PC A21/MF A01; 1; GPO Dep. File Number DE86014879.

By using shock pins, data were gathered on the trajectories of shock waves in stainless steel (SS-304L) and oxygen-free-high-conductivity copper (OFHC-Cu). Shock pressures were generated in these materials by impacting the appropriate target with thin (~1.5 mm) flying plates. The flying plates in these experiments were accelerated to high velocities (~4 km/s) by high explosives. Six experiments were conducted, three using SS-304L as the target material and three experiments using OFHC-Cu as the target material. Peak shock pressures generated in the steel experiments were approximately 109, 130, and 147 GPa and in the copper experiments, the peak shock pressures were approximately 111, 132, and 143 GPa. In each experiment, an attenuation of the shock wave by a following release wave was clearly observed. An extensive effort using two characteristic codes (described in this work) to theoretically calculate the attenuation of the shock waves was made. The efficacy of several different constitutive equations to successfully model the experiments was studied by comparing the calculated shock trajectories to the experimental data. Based on such comparisons, the conclusion can be drawn that OFHC-Cu enters a melt phase at about 130 GPa on the principal Hugoniot. There was no sign of phase changes in the stainless-steel experiments. In order to match the observed attenuation of the shock waves in the SS-304L experiments, it was necessary to include strength effects in the calculations. It was found that the values for the parameters in the strength equations were dependent on the equation of state used in the modeling of the experiments. 66 refs., 194 figs., 77 tabs.

47947 **(N—86-24818) Thermal-mechanical fatigue behavior of nickel-base superalloys. Final Report.** Pelloux, R.M.; Marchand, N. (Massachusetts Inst. of Tech., Cambridge (USA)). Mar 1986. 186p. (NASA-CR—175048; USAAVSCOM-TR—86-C-4). NTIS, PC A09/MF A01.

The main achievements of a 36-month research program are presented. The main objective was to gain more insight into the problem of crack growth under thermal mechanical fatigue (TMF) conditions. This program was conducted at M.I.T. for the period of September 1982 to September 1985. The program was arranged into five technical tasks. Under Task I, the literature of TMF data was reviewed. The goal was to identify the crack propagation conditions in aircraft engines (hot section) and to assess the validity of conventional fracture mechanics parameters to address TMF crack growth. The second task defined the test facilities, test specimen and the testing conditions needed to establish the effectiveness of data correlation parameters identified in Task I. Three materials (Inconel X-750, Hastelloy-X, and B-1900) were chosen for the program. Task II was accomplished in collaboration with Pratt & Whitney Aircraft engineers. Under Task III, a computerized testing system to measure the TMF behavior (LCF and CG behaviors) of various alloys systems was built. The software used to run isothermal and TMF tests was also developed. Built around a conventional servohydraulic machine, the system is capable of push-pull tests under stress or strain and temperature controlled conditions in the temperature range of 25C to 1050C. A crack propagation test program was defined and conducted under Task IV. The test variables included strain range, strain rate (frequency) and temperature. Task V correlated and generalized the Task IV data for isothermal and variable temperature conditions so that several crack propagation parameters could be compared and evaluated. The structural damage (mode of cracking and dislocation substructure) under TMF cycling was identified and contrasted with the isothermal damage to achieve a sound fundamental mechanistic understanding of TMF.

47948 **(N—86-25453) Tensile behavior of Fe-40Al alloys with B and Zr additions.** Gaydosh, D.J.; Nathal, M.V. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 27p. (NASA-TM—87290; E—2997; CONF-860340—7). NTIS, PC A03/MF A01.

From 115. American Institute of Mining, Metallurgical and Petroleum Engineers annual meeting; New Orleans, LA, USA (2 Mar 1986).

Both Fe-40Al and Fe-40Al-0.1Zr with and without B were produced by the hot extrusion of powdered metal. Tensile properties were determined from room temperature to 1100 K in air. All of the materials possessed some ductility at room temperature, and addition of B caused an increase in ductility and a change in fracture mode from intergranular to transgranular cleavage. At high temperatures, failure was caused primarily by the formation of grain boundary cavities in all of the alloys. The effect of Zr addition was unclear because of the complexity of the various microstructures. Comparison of air and vacuum testing at high temperatures revealed that an apparent oxidation assisted mechanism reduced high temperature ductility in these alloys, especially at 900 K.

47949 **(PPA-FR—2) Effects of time, temperature and rotation of water on the corrosion rate of different types of steels.** Muhamad Daud; Jamaliah Shariff. (Unit Tenaga Nuklear, Bangi, Selangor (Malaysia)). 1984. 34p. Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia.

By using hot plate/magnetic stirrer and immersion technique, the steel corroded uniformly and their corrosion rates vary due to type of steel, time of immersion, temperature and rotation of water. Therefore, the rate of general corrosion, or scaling, of steel alloys is influenced by a number of factors, those best established being the composition of the metal, time, temperature, velocity, cleanliness or roughness of the metal surface and direct contact with solutions of the other materials.

47950 **(PPA-T—29) Creep fatigue behaviours of stainless steel (316-SS) at elevated temperatures.** Abdul Aziz Mohamed. (Unit Tenaga Nuklear, Bangi, Selangor (Malaysia)). [1986]. 21p. Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia.

The aim of this work was to study the influence of fatigue and heat-treatment on the creep property of stainless steel-316 at temperatures range 750 to 860 deg C. The work had shown that mechanism of creep process was probably a combination reaction between dislocation intersection and solute drag creep deformation. At high temperatures (>800 deg C) and high stresses (>100 Mpa), the activation energy of as-received specimen was 318 kJ per mol. The stress exponent value was 7.6. The C constant of larson-miller equation is 16.9.

47951 **(SAND—86-0809C) Formation of icosahedral Al-Mn and Al-Ru by solid-state processes.** Follstaedt, D.M.; Knapp, J.A. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 22p. (CONF-860702—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014146.

From 5. international conference on surface modification of metals by ion beams; Kingston, Ontario, Canada (7 Jul 1986).

We have used ion beam mixing and solid-state interdiffusion of interdigitated Al/Mn or Al/Ru layers to form icosahedral surface alloys in the solid state. Higher temperatures are required to form the icosahedral phase in Al-Ru than in Al-Mn, both with mixing (300°C versus 150°C) and by interdiffusion (400°C versus 300°C). Annealing to higher temperatures produces a transformation to more stable crystalline phases. Formation by these techniques indicated that these icosahedral phases nucleate and grow in the solid state in preference to crystalline phases of lower free energy.

47952 **(SAND—86-8231) Mechanical tests on aluminum alloys AMg6 and 5456-0.** Kawahara, W.A.; Totten, J.J.; Korellis, J.S. (Sandia National Labs., Livermore, CA (USA)). Aug 1986. Contract AC04-76DR00789. 27p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014746.

This is a compilation of a preliminary series of mechanical tests performed on specimens extracted from 0.2 in. (5 mm) thick plates of annealed alloy AMg6 and its nearest US equivalent, 5456-0 at room temperature. Included are in-plane tensile data on strain rate sensitivity, quasistatic notched behavior and post-shock properties, and one attempt at spall suppression by back-surface hole drilling.

47953 **Angular dependence of ultrasonic wave propagation in a stressed, orthorhombic continuum: Theory and application to the measurement of stress and texture.** Thompson, R.B.; Lee, S.S.; Smith, J.F. (Ames Laboratory, Iowa State University, Ames, Iowa 50011). *Journal of the Acoustical Society of America;* **80**: No. 3, 921-931(Sep 1986).

A theory for ultrasonic wave propagation in a symmetry plane of a biaxially stressed, orthorhombic continuum is presented. Since many of the material parameters which appear in the analysis are unknown, in particular the third-order elastic constants of polycrystalline metals, emphasis is placed on the angular dependence of the velocities. An expansion to first order in stress-induced anisotropy and to second order in textural anisotropy reveals terms with twofold, fourfold, and sixfold symmetry. Scenarios are proposed for using various properties of this symmetry to deduce the difference in magnitude and directions of the principal stresses independent of textural anisotropy and the textural anisotropy independent of the stresses. Experimental results are presented for the cases of aluminum, 304 stainless steel, and copper.

47954 **Observation of two surface-plasmon modes on gold particles.** Warmack, R.J.; Humphrey, S.L. (Health and Safety Research Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **34**: No. 4, 2246-2252(15 Aug 1986). Contract AC05-84OR21400.

Annealed, thin films of gold were studied by electron microscopy and optical transmission. The particles ranged in size from less than 5 to 100 nm (longest dimensions). The observation of two

surface-plasmon peaks was analyzed by treating the particles as oblate spheroids in which the average shape, as determined by optical measurements, is governed by the heat treatment and evaporation thickness. The depolarizing effect of the substrate was clearly demonstrated by shifts in the frequencies of the resonance peaks. Two resonances associated with surface-plasmon modes of oscillation were observed for each of the two axes of the model oblate spheroids.

47955 **Surface and bulk electronic structure of Ge(111) c-italic(2 x 8) and Ge(111):As 1 x 1.** Bringans, R.D.; Uhrberg, R.I.G.; Bachrach, R.Z. (Xerox Corporation, Palo Alto Research Center, 3333 Coyote Hill Road, Palo Alto, California 94304). **34**: No. 4, 2373-2380(15 Aug 1986).

The surface band dispersion of the annealed (111) surface of germanium has been determined experimentally using angle-resolved photoemission. The c-italic(2 x 8) symmetry seen in low-energy electron diffraction is not seen in the surface-state dispersion, which exhibits a 2 x 2 periodicity. This result is interpreted as indicating that the Ge(111) c-italic(2 x 8) surface unit cell contains 2 x 2 subunits. The surface-state dispersion and bandwidth are consistent with a 2 x 2 adatom model for the surface. An examination is made of the effect of the surface on the near-surface electronic structure. Results for the heavily reconstructed Ge(111) c-italic(2 x 8) surface are compared with those for the Ge(111):As 1 x 1 surface. This latter surface was chosen for comparison because the arsenic termination removes the reconstruction and leads to an extremely stable surface with a geometry close to that of an ideal (111) surface. Spectral features corresponding to bulk initial states were compared with calculated values and found to agree throughout most of the surface Brillouin zone. Discrepancies were found near K-bar and attributed to the effect of back-bond formation. At finite values of k-italic/sub X/, a free-electron parabola with its zero at 9.70 eV below the top of the bulk valence band is the final state which best explains the bulk data. At normal emission, on the other hand, a Bloch conduction-band state was found to be more appropriate. The effect of secondary cone emission on the photoemission is discussed.

47956 **Structure and magnetism of quasicrystalline and crystalline Al/sub 1-//sub x-italic/Mn/sub x-italic/ alloys.** Youngquist, S.E.; Miceli, P.F.; Wiesler, D.G.; Zabel, H.; Fraser, H.L. (Department of Physics and Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801). **34**: No. 4, 2960-2962(15 Aug 1986). Contract AC02-76ER01198.

We have performed x-ray structural studies of quenched and annealed Al/sub 1-//sub x-italic/Mn/sub x-italic/ alloys in the range of 0.14< or =x-italic< or =0.20. The quenched samples exhibit a coexistence of Al with an icosahedral phase, the latter having a maximum volume fraction at x-italic = 0.20. Magnetic susceptibility measurements for x-italic = 0.14 and 0.20 show a dramatically enhanced magnetic moment in the icosahedral phase (p-italic = 0.747 and 1.27, respectively) as compared to the annealed samples (p-italic = 0 and 0.617, respectively). The increase of magnetic moment per Mn ion with increasing Mn concentration indicates a range of stoichiometries and microstructures over which the icosahedral phase can exist.

47957 **Final-state screening of core holes in metals.** Weinert, M.; Davenport, J.W.; Watson, R.E. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). **34**: No. 4, 2971-2974(15 Aug 1986). Contract AC02-76CH00016.

Core-level photoemission is often employed to extract chemical information concerning the atomic site and this requires assumptions concerning the balance between initial-state chemical and final-state screening effects. With this in mind, we have calculated the binding energy of the 4f-italic level in gold metal using local-density total-energy calculations. We find a binding energy of 83.7 eV in good agreement with the experimental value of 83.9 eV. We are thus able to test several less complete computational schemes. For example, confining the response to a single site yields 84.3 eV, an error of 0.6 eV, while limiting the screening to the atom and its near neighbors produces an error of 0.07 eV. In additions, we have calculated the heat of solution of mercury in gold. This may be related via a Born-Haber cycle to the core-level binding energy assuming local screening and the equivalent core approximation. This yields a binding-energy error of 0.15 eV, which, while small, is of significance. Finally, we have explicitly decomposed the binding energy into initial- and final-state contributions and find a relaxation energy in gold of 17.7 eV compared to 13.1 eV for the isolated atom.

47958 **Relative concentration measurements of Mn and Mn^+ in a gas tungsten welding arc using laser-induced fluorescence.** Synder, S.C. (EG&G Idaho, Inc., Idaho National Engineering Laboratory, Idaho Falls, Idaho 83415). *Applied Optics;* **25**: No. 14, 2248-2248(15 Jul 1986). Contract AC07-76ID01570.

Lasar-induced fluorescence is used to determine the distribution of relative concentration to neutral and singly ionized manganese in the interfacial zone of a gas tungsten arc over a molten pool of type 304 stainless steel. (AIP)

47959 **Copper-tantalum alloy.** Schmidt, F.A.; Verhoeven, J.D.; Gibson, E.D. (to Dept. of Energy, Washington, DC). US Patent 4,600,448. 15 Jul 1986. Filed date 31 Jul 1984. vp.

A cast tantalum-copper alloy is described wherein the alloy contains up to about 50 weight percent tantalum.

47960 **Pressure dependence of spin-fluctuation effects in the specific heat of the heavy-fermion superconductor UPt_3.** Brodale, G.E.; Fisher, R.A.; Phillips, N.E.; Stewart, G.R.; Giorgi, A.L. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). **57**: No. 2, 234-237(14 Jul 1986). Contract AC03-76SF00098.

UPt_3 is a heavy-fermion superconductor with indications of coexisting long-range ferromagnetic spin fluctuations. Measurements of its specific heat at pressures of 0, 3.8, and 8.9 kbar between 0.35 and 20 K show that the spin-fluctuation terms are extremely sensitive to pressure: the linear term decreases by —25% at 8.9 kbar; the T-italic^3 and T-italic^5 lnT-italic terms decrease by factors of the order of 4. Comparison with the pressure dependence of the critical temperature suggests that the superconductivity is of a form that is e-italicn-italich-italica-italicn-italicc-italice-italicd-italic by spin fluctuations.

47961 **Observation of negative s-italic-wave proximity effect in superconducting UBe/sub 13/.** Han, S.; Ng, K.W.; Wolf, E.L.; Millis, A.; Smith, J.L.; Fisk, Z. (Ames Laboratory, United States Department of Energy, Washington, DC; Department of Physics, Iowa State University, Ames, Iowa 50011). **57**: No. 2, 238-241(14 Jul 1986). Contract W-7405-ENG-82.

The Josephson I-italic/sub c-italic/ between a Ta-wire probe and an induced, surface, singlet, superconducting state in UBe/sub 13/ decreases with decreasing temperature below the bulk UBe/sub 13/ T/sub c/, in contrast to the increase seen in comparison Mo samples. This shows that the bulk UBe/sub 13/ superconductivity suppresses the induced singlet superconductivity. Such suppression is evidence of a triplet superconducting state in UBe/sub 13/. Evidence is presented for phase slip between weakly coupled single- and triplet order parameters.

47962 **Comment on "Low-energy excitations in α- and γ-Ce observed by photoemission".** Liu, S.H. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **57**: No. 2, 269-269(14 Jul 1986). Contract AC05-84OR21400.

A Comment on the Letter by F. Patthey e-italict-italic a-italicl-italic., Phys. Rev. Lett. 55, 1518 (1985).

47963 **Differential anomalous-x-ray-scattering study of icosahedral and amorphous Pd/sub 58.8/U/sub 20.6/Si/sub 20.6/.** Kofalt, D.D.; Nanao, S.; Egami, T.; Wong, K.M.; Poon, S.J. (Department of Materials Science and Engineering and Laboratory for Research on the Structure of Matter, University of Pennsylvania, Philadelphia, Pennsylvania 19104). 57: No. 1, 114-117(7 Jul 1986).

The total and differential atomic pair-correlation functions of an icosahedral (quasicrystalline) solid were determined for the first time, directly by the differential anomalous-x-ray-scattering technique using synchrotron radiation. The observed atomic distances involving uranium atoms in icosahedral Pd/sub 58.8/U/sub 20.6/Si/sub 20.6/ suggest the presence of a quasicrystalline sublattice with vertex decoration. The pair distribution functions in the icosahedral and amorphous phases are similar up to the second-nearest neighbors, or up to 6 A-circle.

47964 **Wave-vector— and magnetic-field—dependent spin fluctuations in the heavy-fermion system $CeCu_6$.** Aeppli, G.; Yoshizawa, H.; Endoh, Y.; Bucher, E.; Hufnagl, J.; Onuki, Y.; Komatsubara, T. (AT&T Bell Laboratories, Murray Hill, New Jersey 07974). 57: No. 1, 122-125(7 Jul 1986).

We have performed neutron-scattering measurements on a single crystal of $CeCu_6$ in applied magnetic fields from 0 to 6.4 T. The observed momentum-dependent magnetic scattering implies the existence of short-range antiferromagnetic correlations. While it induces no resonances, the field broadens the spectra considerably at T-italic = 0.4 K. An effective Hamiltonian which incorporates both single-impurity Kondo properties and antiferromagnetic Ruderman-Kittel-Kasuya-Yosida interactions describes our data.

47965 **Direct observation of spin waves above T-italic/sub C/ for nickel.** Mook, H.A.; Lynn, J.W. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). 57: No. 1, 150-153(7 Jul 1986). Contract AC05-84OR21400.

Inelastic-neutron-scattering measurements with the constant-q technique have been used to characterize the energy response of the scattering in paramagnetic nickel. At small wave vectors q, the scattering peaks at zero energy, indicative of spin diffusion, but at larger q the scattering maximizes at finite +- E-italic demonstrating that the spectral response has propagating character. The relative width ΔE-italic/E-italic of the excitation decreases with increasing chemical bondqchemical bond as expected, with the excitation becoming well defined as its energy becomes comparable with k-italicT-italic.

47966 **(BLL-M—6623-(5828.4)) Enthalpies of formation of liquid three-component iron-cerium-aluminium alloys.** Petrushevskii, M.S.; Ryss, G.M. (British Library, Boston Spa. Lending Div.). 1986. Translated from Izvestiya Vysshe Ucheb Zaved Chernaya Metallurgiya (USSR), no. 8, 3-6(1985). 7p. Bristish Library Lending Div., Boston Spa, England.

The integral enthalpies of formation of iron-cerium-aluminum melts at 1870K in the entire composition range of the concentration triangle of this system are calculated on the basis of the microinhomogeneous structure of liquid alloys. Formulae for estimating the partial molar enthalpies of solution of components are given.

47967 **(BLL-RISLEY-TR—236-(9091.9F)) Estimation of the high temperature low cycle fatigue strength of welded joints. 1. Proposal of fundamental estimation methods.** Nonaka, I.; Kitagawa, M.; Otomo, A. Translation of Ishikawa-Harima Engineering Review (Japan), v. 22, pt. 2, 103-107(1982) *Ishikawajima-Harima Giho ;* vp(Dec 1985). 19p. (British Library Lending Div., Boston Spa, England).

Two basic estimation methods for the high temperature, low cycle fatigue strength of welded joints are described. In both of these methods the base metal and the weld metal constituting the joint are treated as two independent factors and the fatigue life of the welded joint is predicted by means of previously obtained basic data for these, i.e., fatigue curves and cyclic stress/strain curves. The first estimation method predicts fatigue life on the basis of the value of the stress imposed; the second, on the basis of the mean strain. Prediction values for these methods were compared with experimental results from low cycle fatigue tests performed on welded joints in heating tubes of SUS 316 steel and 2 1/4 Cr - 1 Mo steel. The effect of post-weld heat treatment on the accuracy of the prediction is also considered.

47968 **(BLL-RISLEY-TR—237-(9091.9F)) Evalution of low cycle fatigue strength of welded joints at elevated temperature: applicability of methods of evaluation and plastic restraint.** Nonaka, I.; Kitagawa, M.; Otomo, A. Translation of Ishikawajima Harima Technology Report (Japan), v. 23, no. 6, 515-520(Nov 1983) *Ishikawajima-Harima Giho ;* vp(Nov 1985). 19p. (REPT—2). British Library Lending Div., Boston Spa, England.

The applicability of a method to predict fundamental fatigue strengths proposed in an earlier report is discussed. The effect of plastic restraint due to the difference in the cyclic deformation resistances of the parent material and the weld metal on the accuracy of predicted fatigue life expectancies is determined. An FEM analysis was carried out in order to evaluate the plastic restraint quantitatively; fatigue life expectancy predictions were also made on the basis of the FEM analysis. In this case 304 stainless steel welded joints and 2 1/4Cr-1Mo steel welded joints which had different plastic restraints were used for the test materials and the proportion of weld metal in the gauge length was varied.

47969 **Preparations of rare earth-iron alloys by thermite reduction.** Schmidt, F.A.; Peterson, D.T.; Wheelock, J.T. (to Dept. of Energy). US Patent Application 6-791,972. 28 Oct 1985. 15p. Contract W-7405-ENG-82. DE86013753 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013753.

Disclosed is an improved method for the preparation of high-purity rare earth-iron alloys by the aluminothermic reduction of a mixture of rare earth and iron fluorides.

47970 **Reactions at the Ni-ZrO_2 interface.** Shinde, S.L.; Reimanis, I.E.; DeJonghe, L.C. pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

The degradation of metal-ceramic interface at elevated temperatures in protective ceramic coatings limits their life-time. A model system of nickel particles dispersed in a zirconia matrix is used to resolve these changes. Oxidation at elevated temperatures (900°C) leads to NiO growth at the interface. The matrix is destabilized when the stabilizer is soluble in NiO, resulting in transformation to deleterious monoclinic phase which is found to be one important reason for interface degradation.

47971 **Th-U (thorium-uranium) system.** Peterson, D.E. (Los Alamos National Lab., NM). *Bulletin of Alloy Phase Diagrams;* 6: No. 5, 443-445(1985).

The phase behavior of the Th-U system was studied by a variety of techniques, including X-ray, electrical, resistivity, thermal, and metallographic measurements. The assessed Th-U phase diagram is shown. The system has monotectic, eutectic, and catatectic reactions. No intermetallic compounds are formed, but both Th and U display allotropic transformations. There is significant solubility of U in (Th), whereas the Th solubility in (U) is extremely low. A wide miscibility gap containing two liquids exists at high temperatures.

3602 Ceramics, Cermets, And Refractories

REFER ALSO TO CITATION(S) 47146, 47146, 47375, 47755, 47767, 47891, 47897, 47970, 48271

47972 **(AD-A—167864/8/XAB) Mold and crucible coatings. Final report, April 1984-December 1985.** Canino, S.J.; Geary, A.L. (Nuclear Metals, Inc., Concord, MA (USA)). 28 Apr 1986. 83p. NTIS, PC A05/MF A01.

This report details the investigation of coating materials and their application to the graphite crucible and molds used in melting and casting DU-0.75 Ti Alloy. Different types of washes were investigated: zirconium oxide, zirconium silicate, yttrium oxide, titanium carbide (used as an undercoat), and boron nitride. The parameters investigated in the application of these coatings were number of burnouts of the crucible, method of cleaning, surface condition of the crucible, temperature of the crucible during painting, number and time between coats, and method of drying the crucible. The method of applying the wash affects its adherence to the graphite. The more thorough the drying of the first coat, the more effectively the coating protects the crucible. Drying in still air was detrimental to the success of most washes. Both oven or vacuum drying of the coated crucibles improved the adherence of most washes. Performance of yttrium oxide washes was dependent on the physical properties of the CMC binders. Yttria coating of the molds improved ingot surface quality, compared with zirconia coated or uncoated molds. Generally, zirconium oxide washes outperformed titanium carbide under coated systems and yttrium oxide washes in the elevated temperature tests and in chemistry and ultrasonic results.

47973 **(AERE-R—1763) Impurity diffusion in NiO grain boundaries.** Atkinson, A.; Taylor, R.I. (UKAEA Atomic Energy Research Establishment, Harwell). Apr 1985. 30p. Issuing Activity.

The diffusion of Ce-139 and Cr-51 in polycrystalline NiO has been studied in the temperature range 600-1100C in oxygen at a pressure of 1 atm. These impurities were chosen because of their different effective charges and segregation behaviour and because of their relevance to the oxidation of metals at elevated temperature. The solubility of Ce in the NiO lattice is negligible, but Ce is soluble at NiO grain boundaries and dislocations. Consequently Ce tracer only diffused along these pathways and the resulting profiles were analysed straightforwardly to give grain boundary and dislocation diffusion coefficients. The lattice solubility of Cr, on the other hand, is not negligible and Cr also segregates strongly to NiO grain boundaries. A procedure for analysing penetration profiles of such an impurity has been developed in which parameters describing segregation and grain boundary diffusion are deduced self-consistently. When combined with previous measurements of Ni and Co diffusion it is found that grain boundary coefficients decrease in the order Co, Ni, Cr, Ce as is also found for lattice diffusion (except for Ce, which has negligible lattice solubility). The implication of the results for the distribution of Cr and Ce in NiO films formed by metal oxidation is discussed.

47974 **(AERE-R—11942) Effects of temperature and irradiation on piezoelectric acoustic transducers and materials.** Broomfield, G.H. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Physics and Metallurgy Div.). Dec 1985. 32p. H.M. Stationery Office, London, price Pound 5.00.

This report comprises a compilation of lecture notes on the testing, selection and application of materials for piezoelectric acoustic transducers. The construction of high frequency transducers and the effects of irradiation and temperature on types designed for arduous service are described. The criteria for assessing piezoelectric materials are given as a preamble to a brief discussion of the effects on them of temperature and irradiation. These materials include the powder-route ceramics, lead metaniobate and lead-zirconate-titanate and the single crystal materials, quartz, tourmaline, lithium niobate and strontium niobate. Conclusions on the materials are concerned with the probable future temperature ranges for their applications.

47975 **(CONF-8604103—3) Electron microscopy study of sputtered NbN films.** Ho, H.L.; Kampwirth, R.T.; Gray, K.E.; Capone, D.W. II; Chumbley, L.S. (Argonne National Lab., IL (USA). Materials Science and Technology Div.; Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering). Jul 1986. Contract W-31109-ENG-38. 20p. NTIS, PC A02/MF A01. File Number DE86014571.

From Conference on frontiers of electron microscopy in materials science; Argonne, IL, USA (21 Apr 1986).

The microstructure of sputtered NbN thin films (1 to 3 μm thick) has been analyzed by transmission electron microscopy utilizing transverse sections. The micrographs reveal that the films consist of columnar grains of predominantly fcc NbN, oriented with a <111> direction normal to the substrate. These grains are surrounded by intergranular regions of unknown composition which are 10 to 30 A in width, and the average grain diameter increases linearly as a function of distance from the film/sapphire substrate interface. The new and surprising result is that films grown under different sputtering conditions, which exhibit vastly different superconducting properties, have essentially identical grain size ad shape. However, defects have been observed within the grains and their density correlates well with the transition temperature T/sub c/ and the slope of the upper critical field at t/sub c/.

47976 **(CONF-8609120—1) Use of ammonolytic intermediates for the synthesis of nitrides and carbonitrides.** Maya, L. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013402.

From NATO workshop on the design, activation and transformation of organometallics into common and exotic materials; Cape d'Agde, France (1 Sep 1986).

Liquid ammonia has been used as a reaction medium in which inorganic moieties such as metal halides or hydrides undergo total or partial ammonolysis to produce intermediates which can be converted into precursors of ceramic materials through reactions that utilize the residual halogen for substitution by additional amide ligands or acetylide. The precursors obtained in this manner have a relatively high metal content and readily convert into nitrides or carbonitrides at ≦800°C. Systems examined include aluminum hydride, titanium IV bromide, titanium III chloride and niobium V bromide.

47977 **(DOE/ER/45097—T2) Point defect clusters and electrical behavior in transition metal oxides. Progress report.** Cohen, J.B.; Ellis, D.E.; Mason, T.O. (Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering). 15 Nov 1985. Contract FG02-84ER45097. 15p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86009224.

Electrical properties, defect structures, and electronic structure were studied for such oxides as these of Mn, Co, Fe, Zr, Th, etc. (DLC)

47978 **(DOE/OR/21411—T1) Ceramic life prediction methodology. Final report.** Swank, L.R.; Mangels, J.A.; Caverly, J.C.; Govila, R.K. (Ford Motor Co., Dearborn, MI (USA)). May 1986. Contract AI05-84OR21411. 105p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014424.

Fast fracture and stress rupture data were collected on two materials, a sintered silicon nitride and a lithium-aluminum-silicate. The fast fracture data was presented graphically in the form of Weibull plots of percent failed versus failure stress. The stress rupture results were presented in tabular form. Photo-micrographs were presented to illustrate the fracture surfaces of fast fracture and stress rupture failures. A program of specimen development was conducted. The objective of the program was to develop processing techniques to make it possible to fabricate integral shaft spin disks suitable for hot spin testing as stress rupture specimens. The hot spin disk stress rupture results were to be used to correlate experimental time dependent failure results with analytical time dependent failure results.

47979 **(HEDL—7560) Test plan for long-term, low-temperature oxidation of spent fuel, Series 1.** Einziger, R.E. (Hanford Engineering Development Lab., Richland, WA (USA)). Jun 1986. Contract AC06-76FF02170. 53p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014756.

Preliminary studies indicated the need for more spent fuel oxidation data in order to determine the probable behavior of spent fuel in a tuff repository. Long-term, low-temperature testing was recommended in a comprehensive technical approach to: (1) confirm the findings of the short-term thermogravimetric analyses scoping experiments; (2) evaluate the effects of variables such as

burnup, atmospheric moisture and fuel type on the oxidation rate; and (3) extend the oxidation data base ot representative repository temperatures and better define the temperature dependence of the operative oxidation mechanisms. This document presents the Series 1 test plan to study, on a large number of samples, the effects of atmospheric moisture and temperature on oxidation rate and phase formation. Tests will run for up to two years, use characterized fragmented, and pulverized fuel samples, cover a temperature range of 110°C to 175°C and be conducted with an atmospheric moisture content rangeing from <-55°C to ~ 80°C dew point. After testing, the samples will be examined and made available for leaching testing.

47980 **(HEDL—7577) Test plan for Series 3 NNWSI spent fuel leaching/dissolution tests.** Wilson, C.N. (Hanford Engineering Development Lab., Richland, WA (USA)). Apr 1986. Contract AC06-76FF02170. 50p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014757.

The Series 3 tests will differ from the Series 2 tests in that the Series 3 tests will be run at 85°C (J-13 water) in sealed 304 stainless steel (SS) test vessels. The current NNWSI reference spent fuel container material is 304L SS. The candidate NNWSI repository horizon is above the water table, and 95°C (boiling temperature at the repository elevation) is the maximum liquid water temperature expected to contact spent fuel in the repository.

47981 **(KFK—3966) Oxidation and creep behaviour of dense silicon nitride materials with different compositions.** Ernstberger, U. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung; Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Maschinenbau). Sep 1985. 181p. (In German). NTIS (US Sales Only), PC A09/MF A01. File Number DE86752609.

The study was intended to yield information on the oxidation and creep behaviour of Si_3N_4 materials of different composition and microstructure, and produced by different processes. The experiments carried out in a vast temperature and load range showed that the chemical grain boundary composition is the key parameter affecting the materials' high-temperature properties. Significant correlations could be established between oxidation and creep behaviour on the one hand, and between microstructure and the behaviour on the other.

47982 **(N—86-24836) Improved consolidation of silicon carbide.** Freedman, M.R.; Millard, M.L. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 14p. (NASA-TM—87243; E—2921; CONF-860152—4). NTIS, PC A02/MF A01.

From 10. annual conference on composites and advanced ceramic materials; Cocoa Beach, FL, USA (19 Jan 1986).

Alpha silicon carbide powder was consolidated by both dry and wet methods. Dry pressing in a double acting steel die yielded sintered test bars with an average flexural strength of 235.6 MPa with a critical flaw size of approximately 100 micro m. An aqueous slurry pressing technique produced sintered test bars with an average flexural strength of 440.8 MPa with a critical flaw size of approximately 25 micro m. Image analysis revealed a reduction in both pore area and pore size distribution in the slurry pressed sintered test bars. The improvements in the slurry pressed material properties are discussed in terms of reduced agglomeration and improved particle packing during consolidation.

47983 **(N—86-24839) Particle size reduction of Si_3N_4 with Si_3N_4 milling hardware.** Herbell, T.P.; Freedman, M.R.; Kiser, J.D. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 19p. (NASA-TM—86864-REV; E—2328-1; CONF-860152—5). NTIS, PC A02/MF A01.

From 10. annual conference on composites and advanced ceramic materials; Cocoa Beach, FL, USA (19 Jan 1986).

The grinding of Si_3N_4 powder using reaction bonded Si_3N_4 attrition, vibratory, and ball mills with Si_3N_4 media was examined. The rate of particle size reduction and the change in the chemical composition of the powder were determined in order to compare the grinding efficiency and the increase in impurity content resulting from mill and media wear for each technique. Attrition and vibratory milling exhibited rates of specific surface area increase that were approximately eight times that observed in ball milling. Vibratory milling introduced the greatest impurity pickup.

47984 **(N—86-25267) Compensation in epitaxial cubic SiC films.** Segall, B.; Alterovitz, S.A.; Haugland, E.J.; Matus, L.G. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). Mar 1986. 12p. (NASA-TM—87269; E—2918). NTIS, PC A02/MF A01.

Hall measurements on four n-type cubic SiC films epitaxially grown by chemical vapor deposition on SiC substrates are reported. The temperature dependent carrier concentrations indicate that the samples are highly compensated. Donor ionization energies, E/sub D/, are less than one half the values previously reported. The values for E/sub D/ and the donor concentration N/sub D/, combined with results for small bulk platelets with nitrogen donors, suggest the relation E/sub D/ (N/sub D/) = E/sub D/(O) - alpha N/sub N//sup 1/3/ for cubic SiC. A curve fit gives alpha is approx 2.6x10/5 meV cm and E/sub D/ (O) approx 48 meV, which is the generally accepted value of E/sub D/(O) for nitrogen donors in cubic SiC.

47985 **(PNL—5915) Evaluation of Synroc-C as a second-generation waste form.** Shade, J.W. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1986. Contract AC06-76RL01830. 58p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014818.

The durability of a crystalline titanate waste form, Synroc-C, was evaluated as a second-generation waste form by leach testing. Tests using both monolith and high surface area powdered samples were used with silicate water and brines at 90°C and 150°C for up to 90 days. In addition, low surface area-to-volume ratio, 1-day leach tests were conducted between 90°C and 250°C to determine forward-direction leach rates and activation energies. Dissolution rates of Cs, Mo, Ba, and U indicated that Synroc-C generally performed about an order of magntidue better than uranium-doped 76-68 glass. The release of Cs and Mo from Synroc-C, at least initially, may be primarily from intergranular regions of the material. The activation energy for the release of these elements from glass was about 9 kcal/mol but less than 3 kcal/mol for Synroc-C. In long-term tests, uranium dissolution may be controlled more by the formation of uranium alteration products than by release from the waste form.

47986 **Electronic structure of the (2 x 2)C-italic rho4g-italic carbidic phase on Ni{100}.** McConville, C.F.; Woodruff, D.P.; Kevan, S.D.; Weinert, M.; Davenport, J.W. (Physics Department, University of Warwick, Coventry CV47AL, England, United Kingdom). **34**: No. 4, 2199-2206(15 Aug 1986).

Angle-resolved photoemission measurements of the valence-electronic structure of the Ni{100}(2 x 2)C structure are compared with the results of self-consistent density-functional calculations of the two-dimensional band structure for a c-italic(2 x 2)C overlayer on Ni{100}. Good agreement is found for the energies of the main C 2p-italic— and C 2s-italic—related features at Gamma-bar and the computed dispersion is similar to, but somewhat greater than, that observed experimentally. These experimental features map in the c-italic(2 x 2) surface Brillouin zone defined by the carbon overlayer, and not the (2 x 2) zone of the surface reconstruction. Changes in the d-italic band structure are attributed to this reconstruction and are not found in the calculated bands or in experiments on a c-italic(2 x 2)O overlayer, both of which involve unreconstructed surfaces.

47987 **Dispersion of surface polaritons in uniaxial Al_2O_3.** Chu, Y.T.; Bates, J.B. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). **34**: No. 4, 2757-2761(15 Aug 1986). Contract AC05-84OR21400.

The dispersion of ordinary and extraordinary surface polaritons in uniaxial Al_2O_3 crystals has been measured with use of the attenuated-total-reflection method. Some additional reflectivity minima are observed, which are not associated with the excitation

of surface polaritons, but are due to the low-reflectivity regions bounded by the optical-phonon-mode frequencies and the bulk-polariton dispersion curve. The discrepancies among the theoretical surface-polariton dispersion curves calculated with the use of various methods are discussed.

47988 **Factors influencing the stability of the tetragonal form of zirconia.** Srinivasan, R.; De Angelis, R.; Davis, B.H. (Department of Metallurgical Engineering and Materials Science, University of Kentucky, Lexington, Kentucky 40506). *Journal of Materials Research;* **1**: No. 4, 583-588(Jul 1986).

The p-italicH of the solution that zirconia is precipitated from defines the crystal phase formed after calcination of the material at 400 ° to 600 °C. A metastable tetragonal form is obtained for either low (less than about 5) or high (greater than about 13) p-italicH. The tetragonal phase formed at high p-italicH is much more stable at the calcination temperature than the material obtained at a low p-italicH is. For a material obtained by precipitation at a low p-italicH, monoclinic crystallites, determined by x-ray line broadening, were obtained that were smaller than the tetragonal crystals that produced them. A crystallite size effect, based on x-ray line broadening, is not responsible for the formation or stabilization of the tetragonal phase.

47989 **Crystal structure of SiB_6.** Vlasse, M.; Slack, G.A.; Garbauskas, M.; Kasper, J.S.; Viala, J.C. (Polytechnic Institute of New York, Brooklyn). **63**: No. 1, 31-45(Jun 1986).

The accurate and detailed structure of the compound SiB_6 has been determined by single-crystal X-ray diffraction. The final R value was 6.1% for 4225 reflections. The cell is orthorhombic with space group Pnnm and a = 14.397(7) A, b = 18.318(9) A, c = 9.911(7) A, and from the electron density appears to contain 43 silicon atoms and 238 boron atoms. The structure contains many features found in other structures of boron-rich phases, and obeys the crystal chemistry rules established for them. It contains interconnected icosahedra, icosihexahedra, as well as several isolated boron and silicon atoms. An unusual feature of this structure is the presence of icosihexahedra containing silicon atoms similar to those found previously in BeB_6.

47990 **Carbonate associated with hydroxide sol-gel processing of yttria: An infrared spectroscopic study.** Seaverson, L.M.; Luo, S.Q.; Chien, P.L.; McClelland, J.F. (Ames Lab., U.S. Dept. of Energy, Iowa State Univ., Ames, IA 50011). *Journal of the American Ceramic Society;* **69**: No. 5, 423-429(May 1986). Contract W-7405-ENG-82.

Yttrium hydroxide gel was dried by five techniques to study their influences on the sintering behavior of yttria. Dried precursors, calcined and sintered oxides, and the initial gel were examined via Fourier transform infrared photoacoustic and/or attenuated total reflection spectroscopies. Carbonate was found to be in unidentate coordination to surface yttrium on both the dried hydroxide precursor and calcined oxide particles. An inverse correlation was found between the normalized surface carbonate concentration (carbonate concentration (wt%)/surface area (m^2/g)) of precursors and calcined oxides and the density of their corresponding sintered bodies. Carbonate affects sintered density during the calcination and sintering steps.

47991 **Synthesis of BN using BPO_4 as the boron source.** Bamberger, C.E.; Begun, G.M. (Chemistry Div., Oak Ridge National Lab., Oak Ridge, TN 37831). *Journal of the American Ceramic Society;* **69**: No. 5, c95-c97(May 1986). Contract AC05-84OR21400.

The reaction of BPO_4 with different amounts of NaCN to yield BN and sodium phosphates was studied, mainly as a function of temperature and of the ratio NaCN/BPO_4. Gravimetric data, together with analytical results, allowed the authors to postulate and confirm that the yield of reaction products is dependent on the initial ratio NaCN/PBO_4. An additional reaction between NaCN, BPO_4, and Na_3PO_4 yielding BN was also studied.

47992 **Origins of planar, concave, and convex boundaries during exaggerated grain growth.** Searcy, A.W. (Materials and Molecular Research Div., Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). *Journal of the American Ceramic Society;* **69**: No. 5, c91-c92(May 1986). Contract AC03-76SF00098.

A new surface thermodynamic theory is used to show that exaggerated grain growth is driven by reductions in grain boundary and dislocation free energies produced when a larger grain sweeps out a volume element formerly occupied by small grains. Whether the advancing boundary is planar, concave, or convex depends on the relative rates of ledge nucleation and growth, on the growth direction, and on whether growth occurs at screw dislocations.

47993 **The system TiO_2-$Bi_2Ti_4O_{11}$.** Bamberger, C.E.; Begun, G.M.; Dunn, H.W. (Oak Ridge National Lab., Oak Ridge, TN 37831). *Journal of the American Ceramic Society;* **69**: No. 5, c93-c94(May 1986). Contract AC05-84OR21400.

The system TiO_2-$Bi_2Ti_4O_{11}$ was examined by Raman spectroscopy and X-ray diffraction to determine whether TiO_2 is soluble in $Bi_2Ti_4O_{11}$. The Raman spectral data obtained from preparations made at $\approx$1050°C and cooled to room temperature led us to conclude that TiO_2 is not soluble in the "high-temperature" form of $Bi_2Ti_4O_{11}$. It was also found that extensive grinding of the phase identified as the "high-temperature" form converts it to the "low-temperature" form, stable below 250°C.

47994 **Segregation of Mg to the (0001) surface of single-crystal alumina: Quantification of AES results.** Baik, S. (Structural Ceramics Group, Metals and Ceramics Div., Oak Ridge National Lab., Oak Ridge, TN 37831). *Journal of the American Ceramic Society;* **69**: No. 5, c101-c103(May 1986). Contract AC05-84OR21400.

The actual atomic concentration of Mg segregated to the basal plane of MgO-doped single-crystal alumina surfaces is calculated using an Auger electron spectroscopy quantification method which takes the backscattering factors and Auger electron escape depth into account. The results suggest that Mg segregates as effectively as Ca to Al_2O_3 interfaces. Plausible reasons why Mg has not been detected previously in the grain boundaries of MgO-doped polycrystalline Al_2O_3, while Ca has always been found instead, are discussed.

47995 **Estimating tensile creep data from flexure data.** Rosenfield, A.R.; Shetty, D.K.; Duckworth, W.H. (Battelle-Columbus Labs., Columbus, OH 43201). *Journal of the American Ceramic Society;* **69**: No. 5, c108-c109(May 1986).

Safety factors are derived for converting bend data to tensile data for creep. It is assumed that the ceramic being stressed is subject to preferential damage in tension. The analysis shows that the safety factors can be relaxed considerably when compression data are available to augment the bend data.

47996 **Structure of dichromate-type lead pyrophosphate, $Pb_2P_2O_7$.** Mullica, D.F.; Perkins, H.O.; Grossie, D.A.; Boatner, L.A.; Sales, B.C. (Baylor Univ., Waco, TX). **62**: No. 3, 371-376(May 1986). Contract AC05-84OR21400.

Lead pyrophosphate, $Pb_2P_2O_7$, crystallizes in the triclinic space group P 1 (Z = 4) with a = 6.914(2), b = 6.966(2), c = 12.751(4) A; α = 96.82(3), β = 91.14(3), γ = 89.64(3)°; and V = 612.0(6) A^3. Structural refinement data were collected using an automated diffractometer with MoKα radiation. The lead pyrophosphate structure was refined by a full matrix to an R or 0.069 (R/sub w/ = 0.067) using 2637 unique reflections. The structure has two unique diphosphate groups that are repeated by lattice translations to form sheets of diphosphate groups. The P_2O_7 groups, dichromate type, are eclipsed to within 9.4 and 13.5°. The Pb^{2+} ions are eight- and nine-coordinated to oxygen atoms with average experimental interatomic distances of 2.695 and 2.767 A, respectively.

47997 **(N—86-25420) Manufacture of sintered silicon nitrides.** Iwai, T. (National Aeronautics and Space Administration, Washington, DC (USA)). Oct 1985. Translated from Japanese Patent no. 5988373 (Appl. no. 58169291, 1-3(23 Apr 1981). (NASA-TM—77927). 10p. NTIS, PC A02/MF A01.

Sintered silicon nitrides are manufactured by sintering Si_3N powder containing 2 to 15% in wt of a powder mixture composed of nitride powder of lanthanide or Y 100 parts and AIN powder less than 100 parts at 1500 to 1900 deg. temperature under a pressure of less than 200 Kg/sq. cm. The sintered Si_3N has high mechanical strength in high temperature. Thus, Si_3N_4 93.0, Y 5.0 and AlN 2.0% in weight were wet mixed in acetone in N atom, molded and sintered at 1750 deg. and 1000 Kg/sq. cm. to give a sintered body having high hardness.

47998 **Intermixing at Ni-porous zirconia junctions.** Reimanis, I.; DeJonghe, L.C.; Shinde, S. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

When nickel is diffusion-bonded to porous zirconia, a distributed interface may form consisting of nickel particles filling pores in the zirconia. The mechanism of formation and the parameters influencing the structure and mechanical properties of the resultant distributed interface are discussed.

47999 **A TEM study of Ti induced grain growth and precipitation in hot pressed alumina.** Jayaram, V.; Evans, A.G. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

Coarse grained inhomogeneities in alumina have been examined in the TEM. X-ray analyses of Mg, Ti and Ni are used to explain the formation of coarse grains and the precipitation sequence that follows annealing. The implications of these results for the observed creep rupture behavior will be discussed.

48000 **Characterization of silicon carbide and nitride powder surfaces.** Rahaman, M.N.; Boiteux, Y.; DeLohgne, L.C. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

The surfaces of SiC and Si_3N_4 powders have been characterized using high resolution TEM, XPS and SIMS techniques. XPS is shown to be a powerful technique once a valid means of referencing the peaks is found. Attempts to manipulate the silica layer and its effect on surface properties are discussed.

48001 **Sintered alpha silicon carbide ceramics for high temperature structural application - Status review and recent developments.** Storm, R.S.; Boecker, W.D.G.; Mcmurtry, C.H.; Srinivasan, M. (Sohio Engineered Materials Co., Niagara Falls, NY). pp 9 of Beijing international gas turbine symposium and exposition. Beijing, China; Chinese Society of Aeronautics and Astronautics (1985). (CONF-8509221—).

From Beijing international gas turbine symposium and exposition; Beijing, China (1 Sep 1985).

The physical properties of sintered alpha silicon carbide are reviewed, including the effect of oxidation at high temperatures. Net shape fabricated components are described which have undergone extensive testing in heat engine applications. Properties of an SiC/TiB_2 composite material, which has significantly improved fracture toughness, are presented. 20 references.

3603 Composite Materials

REFER ALSO TO CITATION(S) 47582

48002 **(AD-A—167878/8/XAB) Characterization of ion-implanted and laser-processed wear surfaces. Final report, 1 December 1984-28 February 1986.** Dillich, S.A. (Worcester Polytechnic Inst., MA (USA). Dept. of Mechanical Engineering). 22 Apr 1986. 52p. NTIS, PC A04/MF A01.

SEM/EDX (Scanning Electron Microscopy/Energy Dispersing X Ray Analysis) and scanning Auger microscope analysis were employed to characterize wear surfaces and debris on friction tested, laser-processed metal-carbide composite surfaces. The friction and wear of the composite samples were found to be influenced by the compatibility (degree of mutual solubility) of the carbides with the steel counterface, as well as by local inhomogeneities in the carbide distribution. High-fluence Ti implantation resulted in increased friction and wear, possibly due to an implantation-induced softening or degradation of the carbides. Cavitation erosion tests were performed on nonimplanted and ion-implanted samples of a Co based hardface alloy (Stoody 3). Erosion of the test samples was found to initiate by debonding at the carbide-matrix interfaces and by crack propagation through the carbides. The erosion mechanisms in the alloy were altered by both N and Ti implantations. Ti implantation, in particular, appeared to significantly increase the erosion resistance of the alloy. TEM (Transmission Electron Microscopy) studies were made on nonimplanted and ion implanted foils of Stoody 3, to investigate structural changes induced by implantation. Ti implantation produced a surface layer with an amorphous matrix phase and recrystallized carbides, while N implantation greatly increased the stacking fault density in the matrix phase.

48003 **(PB—86-206356/XAB) Preparation of carbon/ceramic composite materials by use of raw coke (v) - carbon/B_4C composite materials.** Hagio, T.; Ogawa, I.; Yoshida, H.; Kobayashi, K. (Government Industrial Research Inst., Kyushu, Tosu, Saga (Japan)). 1986. 5p. NTIS, PC A04/MF A01).

Carbon/B_4C composites were prepared from the mixtures of raw coke and B_4C with amounts of 0-40 Vol% by pressureless sintering method at 2000 °C for 1 hour. The addition of B_4C to raw coke has improved such properties of carbon materials produced from raw coke only as bending strength, Young's modulus, electrical resistivity, thermal conductivity, and thermal shock resistance. The materials prepared from the mixture with 10 vol% of B_4C showed the lowest electrical resistivity and the highest thermal conductivity. The densification behavior of the mixture and the improvement of properties of the sintered material were considered to be closely related to the diffusion of boron into carbon.

48004 **(UCID—20795) Abrasion and impact resistant coatings.** Hirschfeld, T.; Haugen, G.; Steele, W. (Lawrence Livermore National Lab., CA (USA)). 30 Jun 1986. Contract W-7405-ENG-48. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014433.

Abrasion and impact resistance are a prime requirement for many materials applications. To best protect plastic of metal-based composites from abrasion and impact, a surface coating that is simultaneously very hard and highly yielding is necessary. Both these requirements can be met by a dense pattern of emergent fibers of high L/D ration, well rooted but with one and free, i.e., hair. A covering of such hair, with fibers long enough to bend over, dense enough for mutual shielding but thin enough to accommodate themselves to impacting objects, will give substantial protection against impact or particle abrasion.

48005 **Effect of secondary phases on the properties of B_4C-Al composites.** Sarikaya, M.; Pysik, A.J.; Ilsay, I.A.; Snowden, W.E. (Univ. of Washington, Seattle, WA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

Various secondary phases form during the processing of B_4C-Al composites depending on the processing variables. The type and distribution of these phases are indicated by the reactions which take place during the densification process. Microstructures of the samples prepared under different processing conditions are investigated and correlated with the mechanical properties.

48006 **Processing and microstructural characterization of boron carbide/titanium composites.** Halverson, D.C.; Munir, Z.A. (Lawrence Livermore National Lab., Livermore, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

Preliminary results on the capillarity-thermodynamic behavior of boron-carbide-titanium cermets are presented using contact angle data obtained from sessile drop experiments of liquid titanium on boron carbide substrates. Wetting behavior is compared to other reactive metals on boron carbide. Examination of the interfacial phases that form and their expected role on cermet mechanical properties is also discussed.

3604 Polymers And Plastics

REFER ALSO TO CITATION(S) 47173

48007 **(BMFT-FB-T—86-012) Development of polyurethane-based hydrophobic insulating compounds with long-term thermal and vapour diffusion resistance. Final report.** Schuetz, W.; Rinke, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Jan 1986. 115p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752549.

The objective of the investigation was the development of polyurethane-base modified polyols and isocyanates, i.e. basic compounds for the production of insulating materials. Stability at temperatures above 90°C to 150°C and suitability for heat accumulator insulation were the main requirement. By improving an alcoholysis/acidolysis process, modified polyester polyols could be produced from PU waste. In a similar process, materials were obtained which are primary products for rigid foamed polyurethane with significantly higher resistance against water vapour diffusion and long-term thermal stability. By a subsequent exchange of alcohol links of polymer chains and by insertion of epoxides, other modified polyols were obtained which are suitable for the production of strong foamed polyurethanes with long-time thermal stability at about 150°C. A life up to 30 years can be assumed even if commercial isocyanates are used for the reaction. With 60 refs., 6 tabs., 19 figs.

48008 **(BNL—38242) Conductivity of polybenzimidazole in steam.** Salzano, F.J. (Brookhaven National Lab., Upton, NY (USA)). Jun 1985. Contract AC02-76CH00016. 66p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014762.

Various samples of polybenzimidazole (PBI) sheet supplied by Celanese were received. They were designated as SFD-134, SFD-135, and SFD-136 and were as follows: an unmodified form, a material treated with 20% H_3PO_4, and a sulfonated form of PBI, respectively. The alternating current (ac) conductivity at 1000 cycles/sec of sheet materials ($\approx$0.002 inches thick) was measured at temperatures up to 275°C in high pressure steam environments to $\approx$100 psig. Data obtained showed that these materials generally exhibited low but variable resistance when in equilibrium with liquid water, i.e., saturated conditions, and the resistance decreased with increasing temperature with a small temperature dependence corresponding to 2 to 3 kcal/g mole. At fixed steam pressures, above saturation, the cell resistance increased with increasing temperature with a steep temperature dependence corresponding to -70 to -80 kcal/g mole, in contrast to the data obtained at saturated condition at lower temperatures. These results suggest that the PBI exhibits a form of ion conduction that is dependent on the presence of water. Subsequent ac conductivity measurements at room temperature on a larger variety of wet and dry PBI samples showed a similar large change in resistance between wet and dry conditions, with wet samples exhibiting significantly lower resistances. Furthermore, different preparations and various chemical treatments were shown to affect the resistance of wet PBI materials at room temperature. Detailed data, along with a description of the experimental technique, are presented and discussed.

48009 **(N—86-25284) Thermal desorption study of physical forces at the PTFE surface.** Wheeler, D.R.; Pepper, S.V. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1985. 15p. (NASA-TM—87090; E—2680; CONF-8506305—1). NTIS, PC A02/MF A01.

From International conference on surface and colloid chemistry; Potsdam, NY, USA (24 Jun 1985).

Thermal desorption spectroscopy (TDS) of the polytetrafluoroethylene (PTFE) surface was successfully employed to study the possibile role of physical forces in the enhancement of metal-PTFE adhesion by radiation. The thermal desorption spectra were analyzed without assumptions to yield the activation energy for desorption over a range of xenon coverage from less than 0.1 monolayer to more than 100 monolayers. For multilayer coverage, the desorption is zero-order with an activation energy equal to the sublimation energy of xenon. For submonolayer coverages, the order for desorption from the unirradiated PTFE surface is 0.73 and the activation energy for desorption is between 3.32 and 3.36 kcal/mol; less than the xenon sublimation energy. The effect of irradiation is to increase the activation energy for desorption to as high as 4 kcal/mol at low coverage.

48010 **(ORNL/Sub—84-9009/2) Aging of polyurethane foams, the influence of gas diffusion on thermal conductivity.** Ostrogorsky, A.G.; Glicksman, L.R. (Massachusetts Inst. of Tech., Cambridge (USA)). Aug 1986. Contract AC05-84OR21400. 111p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014339.

it was shown that gas diffusion in closed-cell foams is driven by partial pressure only and not by temperature gradient. The value of the foam effective thermal conductivity can be predicted rapidly and accurately by the developed ECVA code, when the diffusion coefficients of N_2, O_2, CO_2 and fluorocarbon 11 are known. The code can predict the aging rate in different thermal environments. The effective diffusion coefficient can be obtained with sufficient accuracy from the analytical or electrical model, or can be measured directly by the rapid steady state technique. It was found that porous layers exists at the foam/facing interface and inside of the foam panels. By eliminating these layers, the aging performance of the foam can be substantially improved.

48011 **Electroless metal plating of plastics.** Krause, L.J. (to Dept. of Energy, Washington, DC). US Patent 4,600,656. 15 Jul 1986. Filed date 5 Jun 1984. vp.

The product of an electroless plating process is described for plating at least one main group metal directly on a surface of a polymeric substrate comprising the steps of forming a nonaqueous solution containing a metallic salt of an alkali metal in a positive valence state and at least one main group metal in a negative valence state, the main group metal being selected from the group consisting of Ge, Sn, Pb, As, Sb, Bi, Si and Te, selecting an aromatic polymeric substrate reducible by the solublized salt and resistant to degration during the reaction, and carrying out a redox reaction between the salt in solution and the substrate by contacting the solution with the substrate for a sufficient time to oxidize and deposit the main group metal in elemental form to produce a plated substrate. The product is characterized by the plated metal being directly on the surface of the polymeric substrate and the alkali metal being retained in the plated substrate with the substrate being negatively charged with electrons transferred from the main group metal during the redox reaction.

48012 **Quantum Monte Carlo studies of electron—electron interaction effects in conducting polymers.** Campbell, D.K.; DeGrand, T.A.; Mazumdar, S. (Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). 43: No. 3, 803-814(Jun 1986).

We discuss recent studies, using the quantum ensemble projector Monte Carlo (EPMC) method, of theoretical models of conducting polymers. Our focus is on the consequences of incorporating direct electron—electron interactions into the "standard" electron—phonon interaction models. Among the observables we examine one energetics of purely dimerized ground states, single solitons, soliton pairs, averaged spin and charge distributions, and local correlation functions.

3606 Other Materials

REFER ALSO TO CITATION(S) 47402, 47704, 47756, 47756, 47757, 47765, 47830, 47831, 47993, 48137, 48309, 48316, 48949, 49077, 49439, 49444, 49449

48013 **(CONF-860602—5) Analysis of the spectrum of Dy^{3+}:LaF_3 assuming a C/sub2v/ site summetry.** Goodman, G.L.; Carnall, W.T.; Rana, R.S.; Vandevelde, P.; Fluyt, L.; Goerller-Walrand, C. (Argonne National Lab., IL (USA). Chemistry Div.; College of the Holy Cross, Worcester, MA (USA). Dept. of Physics; Louvain Univ., Heverlee (Belgium). Dept. of Chemistry). Jun 1986. Contract W-31109-ENG-38. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014568.

From 17. rare earth research conference; Hamilton, Ontario, Canada (8 Jun 1986).

Previous successful analyses of the observed crystal-field structure in Tm^{3+}:LaF_3 and Ho^{3+}:LaF_3 in an approximate C/sub 2v/ site symmetry have depended upon a crystal-field model derived in an analysis of the spectrum of Er^{3+}:LaF_3. The present investigation compares the predictions of this same model to the observed crystal-field structure in Dy^{3+}:LaF_3. The energy parameters resulting from a least-square fit of the corresponding spectral assignments are reported. To help clarify the physical situation, some comparisions are offered between C/sub 2v/ and D/sub 3h/ crystal-field models for these Ln^{3+}:LaF_3 systems. 7 refs., 3 figs., 2 tabs.

48014 **(CONF-860608—4) Photoelectron, nuclear gamma-ray and infrared absorption spectroscopic studies of neptunium in sodium silicate glass.** Veal, B.W.; Carnall, W.T.; Dunlap, B.D.; Mitchell, A.W.; Lam, D.J. (Argonne National Lab., IL (USA)). Apr 1986. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014489.

From World congress on high tech ceramics: electronic, engineering, nuclear, biomedical research and applications in focus; Milan, Italy (23 Jun 1986).

The valence state of neptunium ions in sodium silicate glasses prepared under reducing and oxidizing conditions has been investigated by the x-ray photoelectron, Moessbauer and optical absorption spectroscopic techniques. Results indicate that the Np ions are tetravalent in glasses prepared under reducing conditions and pentavalent in glasses prepared under oxidizing conditions.

48015 **(CONF-860608—5) Manipulation of displacive phase transformations.** Nevitt, M.V.; Chan, S.K.; Aldred, A.T. (Argonne National Lab., IL (USA). Materials Science and Technology Div.). Apr 1986. Contract W-31-109-ENG-38. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014490.

From World congress on high tech ceramics: electronic, engineering, nuclear, biomedical research and applications in focus; Milan, Italy (23 Jun 1986).

The effect of ion substitutions on displacive higher-order phase transformations in ABO_4 compounds is discussed with respect to the LaNb/sub 1-x/V/sub x/O_4 and BiV/sub 1-x/Nb/sub x/O_4 systems. Although both types of substitution suppress the paraelastic to ferroelastic transformation temperature, their effects on lattice dimensions are of opposite signs. Two alternative explanations are put forward for the suppression of the transformation. One involves the changing coordination around the BO_4 tetrahedra when B is V^{5+} or Nb^{5+}. The second involves application of the ideas of percolation theory, and a plausible estimate can be made of the critical composition at which the monoclinic phase becomes unstable.

48016 **(CONF-860608—6) Effect of microstructure and surface characteristics on phase stability.** Chan, S.K.; Aldred, A.T.; Nevitt, M.V. (Argonne National Lab., IL (USA)). Apr 1986. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014491.

From World congress on high tech ceramics: electronic, engineering, nuclear, biomedical research and applications in focus; Milan, Italy (23 Jun 1986).

A theory is put forth according to which a category of ceramic materials that are susceptible to shear transformations of a continuous kind may be stabilized over a significant subcritical temperature range. The temperature range ΔT/sub c/ is a function of the grain size and the surface characteristics. Application of the theory is made to ceramic oxides of the type LaNb/sub 1-x/V/sub x/O_4 that undergo tetragonal/monoclinic shear transformations. Comparison with experiment indicates that a temperature range of stabilization ΔT/sub c/ $\sim$ 200°C is consistent with the theoretical model.

48017 **(CONF-8605146—8) $(TMTSF)_2PF_6$: evidence for a unified phase diagram.** Kwak, J.F.; Schirber, J.E.; Chaikin, P.M.; Williams, J.M. (Sandia National Labs., Albuquerque, NM (USA); Pennsylvania Univ., Philadelphia (USA). Dept. of Physics; Exxon Research and Engineering Co., Annandale, NJ (USA); Argonne National Lab., IL (USA)). 1986. Contract W-31109-ENG-38. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014588.

From 15. Yamada conference on physics and chemistry of quasi one-dimensional conductors; Lake Kawaguchi, Japan (26 May 1986).

Magnetotransport data on $(TMTSF)_2PF_6$ under pressure is reported which links the ambient-pressure SDW and high-pressure field-induced states. Moreover, the transitions to both states fit the same simple semi-empirical formula using the same parameter values. The sequence encountered with increasing field - metal, semimetal, then semiconductor - is consistent with a scheme proposed by Yamaji. 6 refs., 2 figs.

48018 **(CONF-8606133—7) First polymeric-anion derivatives of BEDT-TTF.** Geiser, U.; Wang, H.H.; Williams, J.M.; Venturini, E.L.; Kwak, J.F.; Whangbo, M.H. (Argonne National Lab., IL (USA); Sandia National Labs., Albuquerque, NM (USA); North Carolina State Univ., Raleigh (USA). Dept. of Chemistry). 1986. Contract W-31-109-ENG-38;AC04-76DP00789. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014485.

From International conference on science and technology of synthetic metals; Kyoto, Japan (1 Jun 1986).

Two unique polymeric-anion derivatives of BEDT-TTF have been synthesized and characterized by single crystal x-ray diffraction, electrical properties measurements, and band electronic structure calculations. They are $(BEDT\text{-}TTF)Ag_4(CN)_5$, 1, and $(BEDT\text{-}TTF)_3Ag$/sub x/I_3 ($x \simeq 6.4$), 2. I contains the first three-dimensional radical-cation donor-molecule network found in an organic conductor and a novel $[Ag_4(CN)_5]^-$ polymeric anion. 2 is the first organic metal-solid electrolyte hybrid and contains alternating layers of BEDT-TTF donor-molecule networks and polymeric silver iodide anions. In the latter, the silver ions are disordered over numerous, partially occupied sites along one-dimensional channels. Both 1 and 2 exhibit metallic conduction at 300 K, but undergo phase transitions at low temperature. 11 refs., 3 figs.

48019 **(DOE/ER/45023—3) Optical studies of dynamical processes in disordered materials. Final report, September 1, 1983-February 28, 1986.** Yen, W.M. (Wisconsin Univ., Madison (USA). Dept. of Physics). 1986. Contract AC02-83ER45023. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014896.

This report outlines the progress achieved on the relaxation and energy transport of optical excitations in amorphous materials. In the understanding of relaxation processes in the excited state, the role of disordered modes has been clarified. A comprehensive macroscopic analysis has been carried out in the donor-donor transfer within an inhomogeneously broadened transition in a glass. Progress has been achieved in measuring and understanding the quantum efficiency of transitions in glass. New initiatives have been

launched in two areas: a study of dynamical processes in activated transparent ceramics; and a program to exploit FEL-FIR radiation for spectroscopic purposes.

48020 **(DOE/ER/45151—2) Physical and chemical properties of graphite intercalation compounds. Progress report, August 1, 1985-October 31, 1986.** Eklund, P.C. (Kentucky Univ., Lexington (USA). Dept. of Physics and Astronomy). 20 Jul 1986. Contract FG05-84ER45151. 12p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014684.

Research on the following is summarized: c-axis electrical properties of acceptor-type graphite intercalation compounds (GICS), resonant Raman scattering in metals, charge transfer and the electrical and lattice dynamical properties of GICS, and hydrogen chemisorption and physisorption in alkali metal GICS. (DLC)

48021 **(INIS-BR—488) Study of the α and β phases of quartz by neutron multiple diffraction.** Mazzocchi, V.L. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)). 1984. 208p. (In Portuguese). NTIS (US Sales Only), PC A10/MF A01. File Number DE86703231.

Crystal structures of α and β phases of quartz are studied, employing neutron multiple diffraction as a method of analysis. Theoretical multiple diffraction patterns in a many-beam case were determined by a computer program which calculates intensities of beams as sums of Taylor's series expansions, retaining terms up to a order n. Experimental 'umweg' and transmitted beam patterns were obtained for the 00.1 primary reflection of α and β phases of quartz. To calculate α - quartz multiple diffraction intensities it was necessary to determine the Dauphine twinning fraction for the crystal after having passed by the β-phase. For the two models of β-quartz a better agreement between experimental and calculated integrated intensities was found for the disordered structure model based on split-half-oxygen positions.

48022 **(N—86-25473) Sputtered cadmium oxide as a surface pretreatment for graphite solid lubricant films.** Fusaro, R.L. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 32p. (NASA-TM—87300; E—3011; CONF-861015—2). NTIS, PC A03/MF A01.

From Joint conference of the American Society of Lubrication Engineers and the American Society of Mechanical Engineers; Pittsburgh, PA, USA (19 Oct 1986).

Sputtered films of cadmium oxide were applied to sand blasted AISI 440C HT stainless steel disks as a surface pretreatment for the application of rubbed graphite films. Mixtures of cadmium oxide and graphite were applied to the nonpretreated sandblasted metal and evaluated. The results were compared to graphite films applied to other commercially available surface pretreatments. It is found that sputtered CdO pretreated surfaces increase the endurance lives of the graphite films and decrease the counterface steady state wear rate of the pins almost an order of magnitude compared to commercially available pretreatments. The CdO additions in general improved the tribological properties of graphite. The greatest benefit occurred when it was applied to the substrate rather than mixing it with the graphite and that sputtered films of CdO perform much better than rubbed CdO films.

48023 **(OUP—84-29) Structure factor determination by electron diffraction.** Gjoennes, J. (Oslo Univ. (Norway). Fysisk Inst.). Nov 1984. 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703230.

A selection of methods for structure factor determination by electron diffraction is presented. Results obtained by the different methods are compared with regard to accuracies in structure determination.

48024 **(SAND—86-0824C) Catalyst preparation via hydrous metal oxide ion-exchangers.** Stephens, H.P.; Dosch, R.G. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 21p. (CONF-8609108—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86012278.

From International symposium on the scientific bases for the preparation of heterogeneous catalysts; Louvain-La-Neuve, Belgium (1 Sep 1986).

Preparation of catalysts via a synthesis route which involves the use of inorganic ion-exchangers based on alkoxide derived Ti, Zr, Nb, and Ta hydrous oxides is described. These materials exhibit several unique properties, including Bronsted acidities that may be varied over many orders of magnitude by a facile ion-exchange process and the capacity to uniformally disperse any metal or mixtures of metals. The activities of Pd-exchanged hydrous titanium oxide catalysts, evaluated for the hydrogenation of pyrene, were found to dramatically increase with Bronsted acidity. The most active of the catalysts was an order of magnitude more active than gamma alumina-supported Pd catalysts prepared by incipient wetness techniques. A mechanism is proposed to account for the high activity of the acidified catalysts.

48025 **(SAND—86-1381C) Overview of electron paramagnetic resonance studies of Si-SiO_2 interface states.** Brower, K.L. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1986. Contract AC04-76DP00789. 8p. (CONF-860895—3). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014720.

From 14. international conference on defects in semiconductors; Paris, France (18 Aug 1986).

There has been a long standing problem concerned with the identity of the Si-SiO_2 interface states which can trap electrical charge. This has been a difficult problem because of the low concentration of such defects, typically 10^{10} to 10^{13}/cm^2, and the lack of experimental techniques capable of probing the nature of these defects on the atomic scale. In this paper an overview of the results that electron paramagnetic resonance has achieved in establishing the structural, electronic, chemical, and electrical identity of interface states at the Si-SiO_2 interface are presented.

48026 **(SAND—86-1601C) Use of DSC to determine the structure of sol-gel derived glasses.** Roth, E.P.; Brinker, C.J. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 7p. (CONF-8609122—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013353.

From 15. North American Thermal Analysis Society conference; Cincinnati, OH, USA (21 Sep 1986).

Differential scanning calorimetry (DSC) has been used to measure quantitative enthalpic changes which accompany gel densification in sol-gel derived glasses. These results, along with measurements of shrinkage and weight loss, were used to identify densification mechanisms. Gel densification is a complex, multistage process consisting of: (1) capillary contraction; (2) condensation polymerization; (3) structural relaxation; and (4) viscous sintering. Gel composition and preparation procedures were varied in order to more clearly observe and quantify some of these densification mechanisms. In particular, metastable defect species were identified by the use of quantitative DSC and Raman spectroscopy.

48027 **(SAND—86-1701C) Sol-gel derived thin films: critical issues.** Brinker, C.J. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 26p. (CONF-8609120—2). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014149.

From NATO workshop on the design, activation and transformation of organometallics into common and exotic materials; Cape d'Agde, France (1 Sep 1986).

The critical physical and chemical issues concerning sol-gel-derived thin films are reviewed. The fundamental physical issues which are currently poorly understood are concentration-induced aggregation and gelation and the physics of drying porous media. These phenomena depend in turn on chemical issues such as the relative rates of condensation and evaporation during film deposition. Preliminary experiments demonstrate the tailoring of thin film structure by controlling precursor polymer structure prior to deposition and the relative rates of condensation and evaporation during deposition.

48028 **(UCID—20816) Computer modelling for the deposition of spherical particulates in a hollow cylinder medium.** Hui, W.C. (Lawrence Livermore National Lab., CA (USA)). 10 Jul 1986. Contract W-7405-ENG-48. 70p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86013922.

One of the main objectives in our task is to develop a way to make uniform low-density-materials. The current method being studied is by means of deep filtration. We are trying to deposit submicron particulates uniformly in a porous medium. The behavior of depositing particulates inside a porous medium is a very complicated phenomenon. It varies with the structure of the porous medium, the fluid dynamics, the particulate properties, etc. All these factors will influence the balance between the mass transfer and the deposition kinetics in the system. It is a desire to develop some computer models that will guide us in the right direction for the development of various systems. This report is devoted to the most basic and the simplest model developed for this purpose. The model presented deals with the deposition behavior of uniform spherical particulates inside a matrix composed of uniform hollow cylinders. We have limited ourselves to the case of 100% sticking coefficient (or capture probability). This specific condition will make the whole system become mainly mass transfer controlled. The basic mass transfer calculations are based on the theoretical solution for the diffusion of aerosol in a laminar pipe flow. The results of the model suggest that it is an intrinsic phenomenon to have much heavier deposition at the upstream entrance area. Therefore, in order to accomplish a uniform deposition, special modifications may be required. A listing of the computer code is included in appendices.

48029 **Contactless measurement of bulk free-carrier lifetime in cast polycrystalline silicon ingots.** Johnson, S.M.; Johnson, L.G. (Solarex Corporation, 1335 Piccard Drive, Rockville, Maryland 20850). *Journal of Applied Physics;* 60: No. 6, 2008-2015(15 Sep 1986).

The spatial dependence of the bulk free-carrier lifetime in cast polycrystalline silicon ingots was determined from contactless measurements of optically modulated free-carrier infrared absorption. Using a cw Nd: yttrium aluminum garnet (Nd:YAG) laser (λ = 1.319 μm) for a probe and a novel pulsed tunable infrared dye laser (λ = 1.10—1.13 μm), with photon energies near the Si band gap, for a pump, the free-carrier lifetime was determined from transient absorption measurements to a maximum depth of 3.0 cm from the surface of polycrystalline silicon ingots. Unmodulated infrared probe transmission measurements were used to monitor relative changes in the bulk precipitate density in ingots due to infrared scattering by the precipitates. Free-carrier lifetime profiles measured along the growth axis of polycrystalline silicon ingots had the same qualitative features as the minority carrier lifetime profile measured from n-italic$^+$ p-italic junction solar cells fabricated on the wafered ingots. Differences between the ingot-measured free-carrier lifetimes and the minority carrier lifetime, apparently due to high injection and possibly carrier trapping effects, are discussed.

48030 **Single crystal, epitaxial multilayers of AlAs, GaAs, and Al/sub x-italic/Ga/sub 1-//sub x-italic/As for use as optical interferometric elements.** Gourley, P.L.; Drummond, T.J. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Applied Physics Letters;* 49: No. 9, 489-491(1 Sep 1986). Contract AC04-76DP00789.

We propose using single crystal multilayers of AlAs, GaAs, and Al/sub x-italic/Ga/sub 1-//sub x-italic/As for use as several different kinds of optical interference elements which include high reflectors, transmission filters, and Fabry—Perot cavities. We have grown many of these structures by molecular beam epitaxy and measured their optical characteristics. We find the characteristics of these structures to be very useful for a number of applications for integrated optical devices which we also propose.

48031 **Response to "Comment on 'Galvanomagnetic luminescence of indium antimonide' " [Appl. Phys. Lett. 49, 537 (1986)].** Berdahl, P.; Shaffer, L. (Applied Science Division, Lawrence Berkeley Laboratory, Berkeley, California 94720). *Applied Physics Letters;* 49: No. 9, 537-538(1 Sep 1986). Contract AC03-76SF00098.

The authors respond to the comments of Morimoto and Chiba by pointing out that the authors theory and unpublished data on the galvanomagnetic luminescence in indium antimonide supports the conclusion that the emission intensity is independent of the thickness for values of the thickness (d) much larger than the effective diffusion length L (3 microns). This contradicts the conclusion of Morimoto and Chiba who determined that the emission varied as d^{-2}.(AIP)

48032 **Laser-driven chemical reaction for etching $LiNbO_3$.** Ashby, C.I.H.; Brannon, P.J. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Applied Physics Letters;* 49: No. 8, 475-477(25 Aug 1986). Contract AC04-76DP00789.

The first laser-driven chemical reaction for etching ionic solids based on the fusion of salts in the molten phase is reported here for the reaction of $LiNbO_3$ with KF. The process involves spatially localized melting of $LiNbO_3$ by high-power-density laser pulses with photon energies in excess of the band gap of $LiNbO_3$. While molten, $LiNbO_3$ undergoes reaction with KF to form niobium oxyfluoride anions by fusion of the salts. The resulting solid is highly water soluble. The insolubility of $LiNbO_3$ permits subsequent removal of only the irradiated area by rinsing in water. This laser-driven chemical etching process shows great potential for applications which require either smooth surface morphology or very rapid etching rates.

48033 **Effect of static charge on the infrared spectrum of amorphous silicon.** Fong, C.Y.; Nichols, C.S.; Guttman, L.; Klein, B.M. (Department of Physics, University of California, Davis, California 95616). 34: No. 4, 2402-2406(15 Aug 1986).

Using first-principles electronic and lattice-dynamics calculations, we calculate the far-infrared spectrum of amorphous silicon including the static polarization due to disorder. The peak positions as well as the magnitude of the absorption coefficient in the region of the bending modes agree with experiment. A random distribution of static charges leads to an infrared spectrum which merely reflects the vibrational density of states.

48034 **Time-resolved reflectivity measurements on silicon and germanium using a pulsed excimer KrF laser heating beam.** Jellison G.E. Jr.; Lowndes, D.H.; Mashburn, D.N.; Wood, R.F. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). 34: No. 4, 2407-2415(15 Aug 1986). Contract AC05-84OR21400.

Time-resolved reflectivity measurements on silicon and germanium have been made during pulsed KrF excimer laser irradiation (248 nm). The reflectivity was measured simultaneously with probe-laser wavelengths of 632.8 and 1152 nm, and the energy density of each laser pulse was recorded. From these measurements, we were able to determine the reflectivity of the hot solid just before the onset of melting, the reflectivity of the melt, the melt duration, and the time of the onset of melting. Melting-model calculations were also performed, with the reflectivity of solid and liquid Si and Ge treated as parameters for fitting the experimental values of the melt duration and the time of the onset of melting. The resulting parameter values are in agreement with those obtained from self-reflectivity measurements. Near the melting threshold, it was observed that the melt duration was never less than 20 ns for Si and 25 ns for Ge, while the maximum reflectivity increased from its value for the hot solid to that for the liquid over a finite energy range. These results, together with a reinterpretation of time-resolved ellipsometry measurements, indicate that, during the melt-in process, the near-surface region does not melt homogeneously, but rather consists of a mixture of solid and liquid phases.

48035 **Photoconductivity and light-induced change in a-italic-Si:H.** McMahon, T.J.; Xi, J.P. (Solar Energy Research Institute, Golden, Colorado 80401). 34: No. 4, 2475-2481(15 Aug 1986). Contract AC02-83CH10093.

Capture-rate constants for the trapping of free carriers into different gap-state species are determined by calculating dc photoconductivity at intermediate generation rates versus the inverse temperature and fitting to data measured on undoped a-italic-Si:H in the as-grown and light-soaked states. In the as-grown state, recombination is dominated by high-capture-rate centers near the Fermi level (dangling bonds) at and above 300 K. To explain the second peak and rapid decrease in photoconductivity at lower temperatures, an energy-dependent capture rate must be invoked on the smaller-cross-section band-tail states, indicating a multiphonon energy-loss process for the trapping of free charge. After 90 h of exposure to 100 mW/cm^2 of light, the decrease found in photoconductivity is explained only by increases in both dangling-bond re-

combination at and above room temperature a-italicn-italicd-italic tail-state recombination at lower temperatures. The increased recombination at lower temperatures after light soaking is attributed to additional donor states located 0.23 eV above the valence-band edge.

48036 **Initial stage of thermal oxidation of the Si(111)-(7 x 7) surface.** Tabe, M.; Chiang, T.T.; Lindau, I.; Spicer, W.E. (Atsugi Electrical Communication Laboratories, Nippon Telegraph and Telephone Corporation, 3-1, Morinosato Wakamiya, Atsugi-shi, Kanagawa, 243-01 Japan). **34**: No. 4, 2706-2717(15 Aug 1986).

We report a systematic study of the early oxidation process in a wide temperature range (20—700XdeC) for the Si(111)-(7 x 7) annealed surface. Oxygen uptake data obtained by Auger-electron spectroscopy indicate that the surface oxygen uptake increases and then gradually saturates with O_2 exposure at 20XdeC. At intermediate temperatures, there is no saturation and the oxygen uptake rate is enhanced. At 700XdeC, the uptake rate is enhanced in the high-exposure (or high-O_2-pressure) region, but is significantly reduced in the low-exposure region, presumably because of oxygen desorption as volatile SiO.

48037 **Lattice dynamics and phonon line shapes in /sup 36/Ar at high temperatures.** Eckert, J.; Youngblood, R.W. (Physics Division, Los Alamos National Laboratory, University of California, Los Alamos, New Mexico 87545). **34**: No. 4, 2770-2776(15 Aug 1986).

The inelastic neutron scattering technique has been used to measure phonon frequencies and phonon line shapes in /sup 36/Ar at temperatures of 81 K [lattice constant a-italic = 5.465(2) A-circle] and 55 K [a-italic = 5.440(2) A-circle] primarily along the [100] and [110] directions. The 81-K data combined with earlier results for small wave vector by Fujii e-italict-italic a-italicl-italic. were fitted to a force-constant model. Detailed comparisons are made of the observed phonon line shapes with those computed from the self-consistent harmonic approximation with added cubic anharmonicity (Glyde and co-workers) and molecular-dynamics simulations (Hansen and Klein). The agreement at high temperatures though still quite satisfactory, was found to be not as good as at low temperatures.

48038 **High-pressure melting curve of KCl: Evidence against lattice-instability theories of melting.** Ross, M.; Wolf, G. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). **57**: No. 2, 214-217(14 Jul 1986). Contract W-7405-ENG-48.

We show that the large curvature in the T-italic-P-italic melting curve of KCl is the result of a reordering of the liquid to a more densely packed arrangement. As a result theories of melting, such as the instability model, which do not take into account the structure of the liquid fail to predict the correct pressure dependence of the melting curve.

48039 **Die-target for dynamic powder consolidation.** Flinn, J.E.; Korth, G.E. (to Dept. of Energy, Washington, DC). US Patent 4,599,060. 8 Jul 1986. Filed date 27 Jun 1985. vp.

A die/target is described for consolidation of a powder to produce monolithic members by the dynamic action of a shock wave, such die/target comprising means forming a metal block having a primary surface for receiving the shock wave, such primary surface having at least one mold cavity formed therein to receive powder to be consolidated, the cavity being located away from the geometrical center of the primary surface to reduce the effect of reflected waves so as to avoid tensile cracking of the monolithic member formed by consolidation of the powder in the cavity by the shock wave.

48040 **Time-resolved picosecond optical measurements of laser-excited graphite.** Malvezzi, A.M.; Bloembergen, N.; Huang, C.Y. (Gordon McKay Laboratory, Harvard University, Cambridge, Massachusetts 02138). **57**: No. 1, 146-149(7 Jul 1986).

A phase transformation in graphite irradiated by visible picosecond laser pulses is observed above a well-defined pump threshold. Time-resolved reflectivity measurements at different wavelengths indicate that the high-temperature phase is not metallic. At low irradiation levels, a fast decaying plasma component is observed.

48041 **Ordering and decomposition in semiconductor alloys.** Martins, J.L.; Zunger, A. (Solar Energy Research Institute, Golden, Colorado 80401). *Journal of Materials Research;* **1**: No. 4, 523-526(Jul 1986).

The stability of ordered semiconductor alloys has been studied, using total energy pseudopotential calculations. The ordered alloys are found to be stabilized with respect to disordered alloys via reduction of the internal strain and by chemical interactions. The Si—C and Si—Ge systems are used as illustrations, finding that ordered Si/sub x-italic/Ge_1/sub -//sub x-italic/ should be a metastable alloy, in agreement with experimental observations.

48042 **On the kinetics of thermal donor formation in silicon.** Borenstein, J.T.; Peak, D.; Corbett, J.W. (Physics Department, SUNY at Albany, Albany, New York 12222). *Journal of Materials Research;* **1**: No. 4, 527-536(Jul 1986).

A model for the kinetic growth of oxygen-related thermal donors in Czochralski silicon at about 450 °C is presented. The model, which is based on the work of Suezawa and Sumino, derives forward reaction rates for the electrically active species by comparing analytic expressions for the early-time annealing kinetics with the infrared electronic absorption data. The analytic expressions, which are independent of the chemical structure of each species, result from three assumptions: (1) the donor defects beyond the first donor species (TD-1) are chemically stable at the donor formation temperature, (2) the reactions for the TD-1 and those electrically inactive clusters smaller than TD-1 are in equilibrium, and (3) the oxygen interstitial concentration remains constant for short annealing times. The parametrized values of the rate constants indicate that the forward rates of reaction vary widely between species, with a sharp peak at the reaction which takes the first electrically active species to the second. If the rate constants are taken to be of the form K-italic = 4πR-italicD-italic, where R-italic is the capture radius for the given forward reaction and D-italic represents the effective diffusion coefficient, then the variation between reaction constants may be associated with differences in capture radii between species, with the diffusion coefficient assumed to be the value determined by Stavola e-italict-italic a-italicl-italic. [Appl. Phys. Lett. 42, 73 (1983)] for "as-provided" material, which has an activation energy of 1.95 eV. The model is successfully applied to the two available sets of infrared absorption data (the Oeder—Wagner and Suezawa—Sumino data) when differences in the annealing temperatures and initial oxygen concentrations are taken into account.

48043 **Energy-dispersive X-ray diffraction study of mean-square atom displacements in highly oriented pyrolytic graphite.** Metzger, T.H. (Brookhaven National Lab., Upton, NY, USA). *Journal of Applied Crystallography;* **19**: No. 3, 200-201(1 Jun 1986). Contract AC02-76CH00016.

The measurement of the mean-square thermal displacement $\langle u^2 \rangle$ of carbon atoms in highly oriented pyrolytic graphite (HOPG) in the hexagonal c direction is reported. Energy-dispersive X-ray diffraction (EDXD) has been used to study the integrated intensity of all Bragg reflections 004 through 0,0,14 as a function of temperature. It is demonstrated that the correction of the Bragg intensities due to thermal diffuse scattering contributions is very important for HOPG, when EDXD is used. The Debye temperature THETAsub(D) = 554(30) K is obtained.

48044 **Kinetics of precipitation of α-Al_2O_3 in polycrystalline supersaturated $MgOx2Al_2O_3$ spinel solid solution.** Panda, P.C.; Raj, R. (Dept. of Materials Science and Engineering, Bard Hall, Cornell Univ., Ithaca, NY 14853). *Journal of the American Ceramic Society;* **69**: No. 5, 365-373(May 1986).

Supersaturated polycrystals of solid-solution spinel were heat-treated below the solvus temperature. Precipitation of α-alumina was examined by X-ray diffraction, microprobe, and scanning transmission electron microscopy. Precipitation kinetics followed classical time-temperature-transformation behavior: the precipitation

rate was growth controlled at large undercoolings and nucleation controlled at low undercoolings. Scanning transmission electron microscopy and microprobe analysis revealed that the growth of precipitates was limited by interface reaction. Nucleation occured throughout the polycrystal and was probably promoted by the grain boundaries. Precipitation was accompanied by the growth of pores at interfaces, presumably to accommodate the change in volume required by the phase transformation. These observations in polycrystals contrast sharply with single-crystal work, where it has been reported that nucleation occurs at the free surface and that the formation of α-alumina is preceded by metastable phases.

48045 **Density of molten sodium aluminosilicates.** Stein, D.J.; Stebbins, J.F.; Carmichael, I.S.E. (Lawrence Berkeley Lab., Berkeley, CA). *Journal of the American Ceramic Society;* 69: No. 5, 396-399(May 1986). Contract AC03-76SF00098.

In order to address controversial discrepancies among earlier measurements, the densities of eight sodium aluminosilicate melts were measured at 1100° to 1550°C. The double-bob Archimedean method was used; it is the most accurate available technique and one not used in previous density measurements in this system. The results of a regression of molar volume with temperature and composition in terms of oxides are presented. The variation of molar volume with composition is linear within the range of the data. The standard error of the fit is <0.2%.

48046 **Cation effects in $NaPO_3$ glasses doped with metal nitrides and oxides.** Rajaram, M.; Day, D.E. (Ceramic Engineering Dept. and Graduate Center for Materials Research, Univ. of Missouri-Rolla, Rolla, MO 65401). *Journal of the American Ceramic Society;* 69: No. 5, 400-403(May 1986).

Oxynitride glasses were prepared by doping a $NaPO_3$ melt with either AlN, Mg_3N_2, or Ca_3N_2. $NaPO_3$ glasses doped with Al_2O_3, MgO, or CaO, so as to contain the same weight percent of each cation as in the oxynitride glasses were also prepared. The dissolution rate in water and the thermal expansion coefficient both decreased while the dilsometric softening point, glass transition temperature, and refractive index increased with increasing nitride or oxide dopant concentration. The properties of the corresponding oxide- or nitride-doped glasses were essentially equal, which indicated that the cation was primarily responsible for the change in each property.

48047 **Surface areas by positron annihilation spectroscopy.** Dale, J.M.; Rosseel, T.M.; Hulett, L.D.; Venkateswaran, K.; Jean, Y.C.; Fuller, E.L. (Oak Ridge National Lab., TN). pp 225-230 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Positron annihilation spectroscopy (PAS) is a technique for measuring the length of time that a positron exists after being injected into a specific material. Lifetime measurements have been used for studying defects in metals. These imperfections affect the localized electron densities which in turn influence the lifetime of the positron before annihilation occurs. Electron density differences are also associated with surfaces. This paper describes the PAS technique and shows a correlation between positron annihilation intensities and surface areas of some fumed amorphous silicas.

48048 **Steel bonded dense silicon nitride compositions and method for their fabrication.** Landingham, R.L.; Shell, T.E. (to Dept. of Energy). US Patent Application 6-736,024. 20 May 1985. 27p. Contract W-7405-ENG-48. DE86013718 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013718.

A two-stage bonding technique for bonding high density silicon nitride and other ceramic materials to stainless steel and other hard metals, and multilayered ceramic-metal composites prepared by the technique are disclosed. The technique involves initially slurry coating a surface of the ceramic material at about 1500°C in a vacuum with a refractory material and the stainless steel is then pressure bonded to the metallic coated surface by brazing it with nickel-copper-silver or nickel-copper-manganese alloys at a temperature in the range of about 850° to 950°C in a vacuum. The two-stage bonding technique minimizes the temperature-expansion mismatch between the dissimilar materials.

48049 **Densification of glass compacts containing a second phase.** Rahaman, M.N.; DeJonghe, L.C. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

The densification behavior of glass powder compacts containing different volume fractions of a dense, hard, second phase was studied. The results are in good agreement with the predictions of a rule of mixtures. The results are compared with those for other ceramic systems and with the predictions of recent theories.

48050 **Characterization of crystallographic phases in the Al_2O_3-AlN system by convergent beam electron diffraction.** Krishnan, K.M.; Thomas, G. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

The structure of two crystallographic phases in the AL_2O_3-AlN system have been determined by CBED. A cubic spinel (Fd3m) phase at a composition of Al_2O_3 - 35mol% AlN and a new long period polytypoid structure (32H) at a composition of AL_4O_3 - 95mol% AlN have been identified. Details of the application of the technique of CBED and the results are presented.

48051 **Convergent beam electron diffraction studies on lead zirconate titanate.** Dass, M.L.A.; Goo, E.; Bielicki, T.; Thomas, G. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

At the morphotropic phase boundary the lattice parameters of the tetragonal and rhombohedral phases are very close to each other and the deviations from cubic structures are very small. Conventional electron diffraction is not adequate to identify the phases present at the morphotropic phase boundary where it is believed that both the tetragonal and the rhombohedral phases coexist. Convergent beam electron diffraction is used to study the $Pb(Zr,Ti)O_3$ solid solution both at the single phase regions and the morphotrophic phase boundary region to identify the phases at the boundary.

48052 **Microstructure and microanalysis of spinel and pyrochlore phases in ZnO varistors.** Goo, E.; Thomas, G. (Lawrence Berkeley Lab., Berkeley, CA). pp vp of Abstracts of the 38th annual Pacific Coast regional meeting of the American Ceramic Society. Columbus, OH; American Ceramic Society (1985). (CONF-851011—).

From 4. symposium on separation science and technology for energy applications; Knoxville, TN, USA (20 Oct 1985).

The location and chemical composition for the spinel and pyrochlore phases in ZnO varistors has been determined by transmission electron microscopy. The composition of the varistors is 94 mole% ZnO, 2 mole% Sb_2O_3, 1 mole% $MnCO_3$, 1 mole% CoO and 1 mole% Bi_2O_3 which was sintered at 1250°C. The spinel phase exists as 1-5 μm size grains and as 0.1 - 0.5 μm particles within ZnO grains. The pyrochlore phase is only present as 500 A particles within ZnO spinel grains. The effect of CoO and $MnCO_3$ additions on the microstructure is examined.

48053 **Structure of di(3,3',4,4'-tetramethyl-2,2',5,5'-tetraselenafulvalenium) pentafluorosilicate, $(C_{10}H_{12}Se_4)_2SiF_5$ at 293 and 125 K.** Eriks, K.; Beno, M.A.; Bechgaard, K.; Williams, J.M. (Argonne National Lab., IL). *Acta Crystallographica, Section C: Crystal Structure Communications;* **C40**: 1715-1717(1984). Contract W-31-109-ENG-38.

The crystal structure of the electrically conducting monovalent anion salt di(3,3',4,4'-tetramethyl-2,2',5,5'-tetraselenafulvalenium) pentafluorosilicate, or $(TMTSF)_2SiF_5$ was determined, using X-ray reflections. No structural phase transition is observed between room temperature and 125 K. The structure is isomorphous with other highly electrically conducting $(TMTSF)_2X$ (X = monovalent anion) salts. The pentafluorosilicate ion is disordered at both temperatures. This report represents the first structural study of a 2:1 TMTSF salt containing an anion with a geometry intermediate between octahedral and tetrahedral. The structure is considered to contain positively charged TMTSF sheets that are interconnected through short Se-Se contacts, with the anions located between the sheets. The above features, plus hydrogen bonding between methyl groups and fluorine atoms, are likely responsible for the unusual electrical properties associated with anion-ordering transitions in this class of compounds.

48054 **Novel structure modulation in the first ambient-pressure sulfur-based organic superconductor (BEDT-TTF)$_2$I$_3$.** Leung, P.C.W.; Emge, T.J.; Beno, M.A.; Wang, H.H.; Williams, J.M.; Petricek, V.; Coppens, P. (Argonne National Lab., IL). *Journal of the American Chemical Society;* **106**: No. 24, 7644-7646(1984). Contract W-31-109-ENG-38.

The compound bis(ethylenedithio)tetrathiofulvalene, or ET, is the first ambient-pressure sulfur-containing organic superconductor. It is further unique in having a displacively modulated structure below 200 K, which persists to at least 11 K. Important features of the room-temperature structure are the existence of ribbons of triodide anions and loose columnar stacks of ET molecules having intrastack S-S distances greater than 3.6 A, the sum of the van der Waals radii. The ET molecules are linked into infinite corrugated sheets by short interstack S-S distances less than 3.6 A and which lie approximately perpendicular to the ET molecule column-packing axis. These short interstack distances appear especially pertinent to the anisotropic (two-dimensional) electrical properties, which include a relatively high conductivity in directions parallel to the sheets. Crystal data was obtained by X-ray diffraction by use of the JANA program, which allows the description of the main and satellite intensities in a modulated structure in terms of one or more sinusoidal displacement waves with associated phases.

48055 **Synthesis of surface reactance using an artificial dielectric.** King, R.J.; Thiel, D.V.; Park, K.S. (Lawrence Livermore National Lab., CA). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Antennas and Propagation;* **AP-31**: No. 3, 471-476(May 1983).

A thin artificial dielectric layer consisting of a rectangular array of closely spaced, thin conductive cylinders (pins), was constructed above a perfectly conducting ground plane. The reactance of the surface was measured at 4.8 GHz for a variety of pin heights and dielectric embedding material by measuring the height-gain profile of a transverse magnetic (TM) surface wave launched across it. Design equations using the theories of artificial dielectrics and propagation in anisotropic media are given. These can be used to predict the surface reactance providing a correction factor accounting for fringing fields at the tops of the pins is included. Using an embedding dielectric tends to reduce this fringing effect. 16 references, 1 table.

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48056 **(BNL—38365) Some uncertainties associated with preparation of standards in organic matrix.** Cholewa, M.; Hanson, A.L.; Jones, K.W.; McNally, W.P.; Fand, I. (Brookhaven National Lab., Upton, NY (USA); Institute of Nuclear Physics, Krakow (Poland); State Univ. of New York, Stony Brook (USA). Dept. of Psychiatry and Behavioral Science). 1986. Contract AC02-76CH00016. 10p. (CONF-8604229—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014173.

From 2. international symposium on biological reference materials; Neuherberg, F.R. Germany (24 Apr 1986).

Until recently no techniques which have multielement detection capability, high sensitivity and good spatial resolution in relatively thick tissue sections have existed. The use of proton induced x-ray emission /PIXE/ and synchrotron radiation induced x-ray emission /SRIXE/ using proton and x-ray microbeams changed this situation. However there are some difficulties with the existing standards for quantitatively calibrating the trace elements concentration in biological materials. For the purpose of our experiments a special technique of standard production was applied. 7 refs., 1 tab., 1 fig.

48057 **(CONF-860921—1) Supported liquid membranes in 1986: new technology or scientific curiosity.** Danesi, P.R. (Argonne National Lab., IL (USA)). 1986. Contract W-31-109-ENG-38. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86007504.

From International solvent extraction conference; Munich, F.R. Germany (11 Sep 1986).

Thin layers of organic solutions of solvent extraction reagents (membrane carriers), immobilized on microporous inert supports and interposed between two aqueous solutions (feed and strip), were first proposed more than two decades ago as a new and promising technique for separating and concentrating metal species. Such immobilized layers, representing supported liquid membranes (SLM), have been extensively studies by our group during the last six years mainly for their ability to separate and concentrate metal ions of critical and strategic importance and of relevance to the nuclear industry. In this presentation the major results obtained by our group up to 1986 in the field of SLM's are summarized. A brief indication of the major problems to be addressed to implement SLM's as a new separation technology is also given. 5 refs., 5 figs., 3 tabs.

48058 **(ENEA-RT-TIB—86/5) Application of thermal and epithermal neutron activation analysis to rock and sediment samples. Advantages of matrix preseparation for rare earth element determination.** Madaro, M.; Moauro, A. (ENEA, Rome (Italy)). 1986. 10p. (CONF-8506271—1). NTIS (US Sales Only), PC A02/MF A01. File Number DE86901526.

From 2. Hungaro-Italian symposium on spectrochemistry: natural materials and spectral analysis; Budapest, Hungary (10 Jun 1985).

Neutron activation analysis (NAA) has been applied to the determination of several trace elements in rocks and in marine sediments. Epithermal neutron activation analysis (ENAA) has been shown to be useful in the analysis of rocks, because some strong activities limiting the instrumental determination of many elements are reduced. Some USGS geological reference materials have been activated by both thermal and epithermal neutrons, evaluating the experimental advantage factors of ENAA and comparing the obtained concentrations and the detection limits for both methods. ENAA is particularly useful to determine several elements, among which some of the rare earth elements (REE), whose importance in petrogenetic studies is well known. In the case of marine sediments, the REE are considered particularly important for simulating the

chemical behaviour of the actinides in the environment. For this purpose, REE have been determined after a group separation from the matrix, in order reduce the complexity of the activation gamma-ray spectra. This separation step improves detection limits for all REE, allowing the determination of some of them not easily detected without a separation, like Nd, Gd, Tb and Tm.

48059 **(EUR—10294-EN) Certification of the elemental composition of BCR reference material No. 183 containing carbon, hydrogen, fluorine, sulphur, phosphorus and copper.** Belliardo, J.J.; Colinet, E.; Griepink, B.; Le Duigou, Y. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1985. 40p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

BCR information. Applied metrology.

A compound of empirical composition $C_{37}H_{30}CuF_3O_3P_2S$ [bis(triphenylphosphine)-copper-trifluoromethanesulphonate] has been specially synthesized and purified, and the elemental composition determined in an interlaboratory exercise involving eleven laboratories of EC member countries. A variety of independent analytical methods were applied. The results of the measurements have permitted the contents of the following elements to be certified: carbon, hydrogen, fluorine, sulphur, phosphorus, copper. This report describes the certification procedure and analysis of the results.

48060 **(EUR—10380-EN) Certification of lead and cadmium in three lyophilized blood materials. CRM No. 194, 195, 196.** Yeoman, W.B.; Colinet, E.; Griepink, B. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1985. 57p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

BCR information.

The report describes the work for certification of lead and cadmium in three lyophilized samples of bovine blood materials. Homogeneity and stability tests were carried out and are presented in the report. The concentrations of lead and cadmium in each sample of the reconstituted blood are certified. A variety of well established methods were used for certification of the materials.

48061 **(INIS-mf—10151) Quantitative determination of sulfur and chlorine in crude oils by X-ray fluorescence spectrometry.** Ayala Jimenez, R.E. (Direccion General de Energia Nuclear, Guatemala City (Guatemala); San Carlos Univ. of Guatemala, Guatemala City). 28 Feb 1986. 74p. (In Spanish). NTIS (US Sales Only), PC A04/MF A01. File Number DE86703246.

Given the importance of sulfur and chlorine content in crude petroleum, and that the actual methods used in the country to its determination are slow and cumbersome, the present work consisted in applying a new method, based on X-ray fluorescence spectrometry, to make this analysis as fast as possible with greater sensibility and precision. Samples of crude petroleum were analyzed using two different quantitative methods: a) through calibration curves elaborated with standard aqueous solutions of inorganic salts of S and Cl and b) through standard addition method using CS_2 as standard for S and CCl_4 for Cl. The measuring system consisted of Fe-55 radioactive source (10 mCi), Si-Li semiconductor detector, spectrum amplifier, multichannel analyzer and a digital Computer. The peak areas and their deviations were obtained through AXIL software. The values of area and deviation joined to weight of sample and amount of standard added were used to calculate the concentration of the analite and its deviation. In conclusion, calibration curves enable only semiquantitative analysis. However, the standard addition method has advantages over ASTM methods D 129-64 and D 808-63 for sulfur and chlorine respectively. The main advantage is the great speed with which an analysis is made: 20 minutes, while ASTM methods need approximately 16 hours. Likewise it was obtained: sensibility 0.05%; accuracy: maximum 0.02%, minimum 10%; and precision: maximum 2%, minimum 10%.

48062 (INIS-mf—10174, pp IV/12) **High sensitive activation analysis using an underground laboratory for gamma-spectroscopy.** Helbig, W.; Niese, S. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden, German Democratic Republic). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48063 (INIS-mf—10174, pp XI/59) **Determination of carbon-14 in Bulgarian wines.** Kostadinov, K.N.; Yanev, Y.L. (Sofia Univ., Bulgaria. Khimicheski Fakultet). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48064 (INIS-mf—10174, pp XII/63) **Attempt to determine environmental ^{36}Cl in groundwater by liquid scintillation counting.** Florkowski, T. (Institute of Physics and Nuclear Techniques, Krakow, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48065 (INIS-mf—10174, pp XII/64) **Determination of $^{238}U/^{234}U$ ratio by means of liquid scintillation technique.** Tomza, I.; Pluta, I. (Central Mining Institute, Katowice, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48066 (INIS-mf—10174, pp XIII/78) **Neutron activation method of U content determination by ^{133}Xe.** Fisenko, A.V.; Kashkarova, V.G.; Lavrukhina, A.K. (AN SSSR, Moscow. Inst. Geokhimii i Analiticheskoj Khimii). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48067 (INIS-mf—10174, pp XIII/79) **Thin layer surface activation by charged particles used for wear investigations.** Kosinova, M.; Tendera, P. (Statni Vyzkumny Ustav Materialu, Prague, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48068 (INIS-mf—10174, pp XIII/84) **Gamma-ray spectrometric measurement of natural radionuclides distribution in rocks.** Benovic, D.; Chrapan, J.; Katlovsky, V. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta; Slovenska Akademia Vied, Bratislava, Czechoslovakia. Geologicky Ustav). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48069 (INIS-mf—10174, pp XV/90) **Measurement of all radium isotopes at environmental levels on a single electrodeposited source.** Short, S. (Australian Atomic Energy Commission, Sydney). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48070 (INIS-mf—10174, pp XVII/100) **Measurement of plutonium-241 in the terrestrial environment.** Wilkins, B.T.; Major, R.O. (National Radiological Protection Board, Chilton, UK). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48071 (INIS-mf—10174, pp XVII/101) **Gamma-spectrometric investigation of low activities of technogenic radionuclides in the surface air layer.** Veleva, B.; Kolarova, M.; Teneva, M.; Dimchev, T. (Bylgarska Akademiya na Naukite, Sofia; Vissh Minno-Geolozhki Inst., Sofia, Bulgaria). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48072 (INIS-mf—10174, pp II/4) **^{10}Be in natural archives: information on past solar modulation and climate.** Beer, J. (Bern Univ., Switzerland. Physikalisches Inst.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48073 (INIS-mf—10174, pp II/2) **Accelerator mass spectrometry with heavy ions.** Haberstock, G.; Henning, W.; Kato, K. (Technische Univ. Muenchen, Garching, Germany, F.R. Fakultaet fuer Physik). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48074 (INIS-mf—10174, pp III/6) **Analysis of ^{81}Kr in groundwater using laser resonance ionization spectroscopy.** Kramer, S.D.; Hurst, G.S.; Chen, C.H.; Psyne, M.G.; Allman, S.L.; Phillips, R.C.; Lehmann, B.E.; Oeschger, H.; Loosli, H.H.; Villis, R.D. (Oak Ridge National Lab., TN, USA; Bern Univ., Switzerland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48075 (INIS-mf—10176) **Time-of-flight mass spectrometer with ^{252}Cf surface ionisation coupled with high-pressure liquid chromatography for determining pharmaceutical substances in the blood.** Danigel, H. (Marburg Univ. (Germany, F.R.). Fachbereich Physikalische Chemie). 14 Dec 1983. 106p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752568.

Cf-252 PDMS is well suited for routine applications and can be combined with HPLC. This combined analytical system can be used for measuring the concentrations of pharmaceutical substances in body fluids on the basis of an internal standard. The results (pharmacokinetics, metabolism) indicate the necessary therapeutical dose and the efficacy of the substance applied.

48076 (INIS-mf—10416, pp 57-65) **Role and potential of analytical chemistry in the production of WWER-1000 nuclear reactors.** Cizek, Z.; Janousek, I. (Skoda Plzen, Czechoslovakia. Ustredni Vyzkumny Ustav). 1984. (In Czech). NTIS (US Sales Only), PC A15/MF A01. File Number DE86703249. (CONF-8404313—).

From Symposium on materials and technology problems of WWER type reactors; Marianske Lazne, Czechoslovakia (9 Apr 1984).

The main uses of analytical chemistry for the manufacture of nuclear reactors are discussed. Presented are general possibilities of using analytical chemistry for the evaluation of the chemical composition of materials, monitoring their purity and for the solution of various specialized problems. The existing technical possibilities are specified of the enterprise, namely of the Chemical Laboratories of the Central Research Institute of Skoda Plzen.

48077 (JEN—579) **PETOS-Basic programs for treating data and reporting results in atomic spectroscopy.** Roca, M. (Junta de Energia Nuclear, Madrid (Spain)). 1985. 51p. (In Spanish). NTIS (US Sales Only), PC A04/MF A01. File Number DE86703245.

A PETOS-Basic program was written which provides the off-line treatment of data in optical emission spectroscopy, flame photometry and atomic absorption spectroscopy. Polynomial calibration functions are fitted in overlapped steps by the least squares method. The calculated concentrations in unknown samples are stored in sequential files (one per element, up to four), from which they can be read to be reported in a second program. 7 refs.

48078 (MINTEK-M—209) **Surface-chemical and mineralogical properties relevant to the flotation of talc and other layer silicates.** Steenberg, E.; Harris, P.J. (Council for Mineral Technology, Randburg (South Africa)). 5 Jul 1985. 22p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703153.

Certain physicochemical and mineralogical properties of different talc and pyrophylite samples were measured to show whether differences in floatability could be related to these properties. An indication of the expected hydrophobic nature of the samples was obtained by X-ray-diffraction measurements. The various samples were characterized by measurement of their zeta potentials, contact angles, suspension stability, and flotation behaviour in small-scale flotation cells. All the talc samples proved to be highly floatable and therefore only small differences in recoveries were observed. However, there was some indication that the suspension stability was related to the X-ray-diffraction measurements of the hydrophobic nature of the samples. No trends were observable from the zeta potentials and contact angles measured.

48079 (MLM—3362) **Assay of ceramic headers for sodium by neutron activation.** Anderson, M.E. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 30 Jun 1986. Contract AC04-76DP00053. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014266.

A procedure was developed for assaying alumina ceramic headers for sodium by neutron activation using the reaction ^{23}Na(n,γ)^{24}Na. The neutron source is a californium-uranium subcritical assembly called the CFX. Major interference results from the fast neutron reaction ^{27}Al(n,α)^{24}Na. The assay and calibration procedures are described as well as the thermal and fast neutron gradients at the CFX flux trap. 3 refs., 8 figs.

48080 (NAC-AR—85-01, pp 209-211) **Nuclear analysis: applications in industry and agriculture.** 1985. NTIS (US Sales Only), PC A13/MF A01. File Number DE86702790.

In Annual report June 1985.

The importance of trace elements in assisting or adversely affecting plant growth is well-established. Nuclear analytical techniques can again be effectively applied to measure trace element composition and the relative effect of environmental conditions.

48081 (ORNL/TM—9950) **Turbulent dispersion results from gel-sphere processes and application to centrifugal contactors.** Haas, P.A. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 39p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014395.

Three different devices using controlled velocities of organic liquids were applied to disperse aqueous solutions as drops. One consisted of simple tubes of small diameters. A second contained motionless mixer units inside large tubes. The third employed couette flow of the organic liquid between a cylindrical rotor and a stationary cylinder. These devices were applied to gel-sphere processes in which the liquid drops are converted into solid gel spheres of hydrated metal oxides. The gel-sphere products are good, strong spheres and allow good measurement of the sphere and the drop-size distributions. The drop diameters must be controlled and predictable to allow preparation of product spheres of the desired sizes. Empirical correlations were determined for application to the gel-sphere processes. The theory of turbulent dispersion based on eddy velocities has been developed by Kolmorogoff, Hinze, and others. Davies reviewed this theory and the agreement of theory

with four types of dispersion devices for energy dissipation rates of 6 to 400,000 W/g. The gel-sphere results for drop-size distribution are for energy dissipation rates of 10^{-3} to 1.5 W/g. Those combined results support the theory of turbulence as the dispersion mechanism over a range of 10^9 for the rate of energy dissipation. The turbulent dispersion with Couette flow is the mechanism for mixing in an advanced design of centrifugal contactors for solvent extraction. The theory of turbulence is applied to predict drop sizes and mixing power for centrifugal contactors as developed at Oak Ridge National Laboratory (ORNL). 14 refs., 7 figs., 6 tabs.

48082 **(PB—86-205309/XAB) Improved analyzer for determining helium-4 in parts-per-billion range. Report of Investigations/1986.** Seitz, C.A.; Holland, P.W. (Bureau of Mines, Amarillo, TX (USA). Helium Field Operations). 1986. 14p. (BM-RI—9010). NTIS, PC A02/MF A01.

The Bureu of Mines has modified its parts-per-billion helium-4 analyzer to improve the analytical capabilities of the instrument. The modifications resulted in the following improvements: (1) the analytical precision of the instrument for 10 consecutive analyses was improved to + or - ppb at the 5000 ppb helium-4 level, (2) the helium-4 sensitivity was increased almost tenfold, and (3) the minimum detectable limit for helium-4 was improved to 0.5 ppb. The modifications made to improve the instrument included replacing the ion-source control circuit with a direct-current solid-state design, controlling the temperature of the ion source, stabilizing and reducing the pumping rate of the vacuum system, and optimizing peak integration.

48083 (PNCT-N—831-83-01, pp 27-32) **Determination of nitrogen in PuO_2-UO_2 mixed oxide with fusion-TCD method.** Hiyama, Toshiaki; Takahashi, Toshio; Ohuchi, Yoshiro; Suzuki, Takeshi; Kaya, Akira. (Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki, Japan. Tokai Works). Sep 1983. NTIS (US Sales Only), PC A08/MF A01. File Number DE86780437.

In Annual progress report of Power Reactor and Nuclear Fuel Development Corporation, Tokai Works. April 1982-March 1983.

Nitrogen in plutonium and uranium mixed oxide has been determined by several different methods. In the classical Dumas method, nitrogen is measured volumetrically. Other procedures are modifications of the Kjeldahl method in which nitrogen is converted to ammonia. All these methods are accompanied with the same problems in which the analysis takes usually 2 or 3 days with waste solutions generated. So far, the authors have tried to determine nitrogen in PuO_2-UO_2 mixed oxide with an improved dry process, in which an impulse furnace is used to heat the sample in a graphite crucible under a helium atmosphere. Nitrogen released from the sample was separated from other gases (i.e., a large amount of carbon monoxide, very small amount of hydrogen etc.) by a combination of original two moleculer sieve columns and pre-cut system. Separated nitrogen was then detected on the basis of thermal conductivities.

48084 **(RT/TIB—85/27) Applied research performed and in progress by using a TRIGA nuclear reactor.** Moauro, A.; Madaro, M. (ENEA, Casaccia (Italy). Dipartimento Tecnologie Intersettorialli di Base). Oct 1985. 23p. (CONF-850932—3). NTIS (US Sales Only), PC AA02. File Number DE86901559.

From Seminar on applied research and service activities for research reactor operations; Copenhagen, Denmark (9 Sep 1985).

The TRIGA reactor of ENEA Casaccia has been used in different applied research fields among which particularly applications of neutron activation analysis (NAA) are reported. The results are referred to the determination of about 30 microelements in marine suspended particulate matter and sediments. A study was also performed on the impurities of the filters used for environmental studies and an intercomparison was carried out on two sediments distributed by the Joint Research Center, Ispra, Euratom. Many applications of NAA have been performed in forensics on request of Italian Courts for determination of gunshot residues, particularly on paraffin gloves and clothes of person suspected to have handled and/or fired a gun; also the firing distance was determined in some cases. The uptake of cobalt and zinc has been studied in pot and the tolerance index was established in cooperation with the Istituto di Cerealicoltura Roma. The rare earth concentrations normalized with respect to the chondritic rocks can be utilized for petrogenetic studies and some determinations have been performed both by thermal and epithermal NAA on some rock samples. A program of utilization of the TRIGA reactor in the field of the preparation of a Ir-191m generator has been provided for applications in the pediatric angiography. For this purpose a cooperation with the Clinical Physiology Institute of National Research Council of Pisa has been established.

48085 (ZfI-Mitt—99, pp 5-37) **Contributions to the chemistry of lanthanides and transplutonium elements.** Bruchertseifer, H.; Hussonnois, M.; Krupa, J.C.; Constantinescu, M.; Constantinescu, O. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung; Institut de Physique Nucleaire, Orsay, France; Institutul de Fizica si Inginerie Nucleara, Bucharest, Romania). Dec 1984. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86780479.

In Report of the Central Institute for Isotope and Radiation Research.

In order to find the conditions for the fast and selective chemical separation of individual nuclides from a group of transfermium elements the following experiments have been carried out: extraction of bivalent ions as kryptate complexes taking strontium as an example and the electro-chemical reduction of europium(III) and stabilization of the formed europium(II) with kryptands. The results obtained have been applied to separate bivalent ions from aqueous solutions for analysing the products of the nuclear reaction $^{249}Bk + {}^{22}Ne$. Finally, first quantitative data are presented for the hydrolysis of Md^{2+} in aqueous solution.

48086 **Photochemical effects in 205-nm, two-photon-excited fluorescence detection of atomic hydrogen in flames.** Goldsmith, J.E.M. (Combustion Research Facility, Sandia National Laboratories, Livermore, California 94550). **11**: No. 7, 416-418(Jul 1986).

This Letter describes photochemical effects observed by using 205-nm, two-photon-excited fluorescence spectroscopy to measure the atomic-hydrogen concentration in atmospheric-pressure hydrogen—oxygen flames. We found that the 205-nm radiation photolyzed water produced in the flame, forming atomic hydrogen in concentrations higher than those naturally present in lean flames and leading to erroneous concentration measurements. UV excitation of molecular oxygen transitions near 205 nm is also discussed; such excitation, followed by rapid predissociation to produce atomic oxygen, may also affect some flame measurements.

48087 **Quenching-independent fluorescence measurements of atomic hydrogen with photoionization controlled-loss spectroscopy.** Salmon, J.T.; Laurendeau, N.M. (Flame Diagnostics Laboratory, School of Mechanical Engineering, Purdue University, West Lafayette, Indiana 47907). **11**: No. 7, 419-421(Jul 1986).

Quenching-independent fluorescence by atomic hydrogen has been measured with photoionization controlled-loss spectroscopy (PICLS) in stoichiometric and fuel-rich premixed $H_2/O_2/N_2$ flames at a pressure of 20 Torr. These measurements are compared with conventional fluorescence measurements in the same flames. When matched in the postflame zone, the two sets of measurements diverge in the preheat zone between the burner surface and the peak of the fluorescence profiles. This divergence, caused by changes in the local quenching rate coefficient, shows the utility of PICLS for determining the kinetics of atomic hydrogen in the preheat zone.

48088 **Laser-enhanced electron-impact ionization spectroscopy.** Bushaw, B.A.; Cannon, B.D.; Gerke, G.K.; Whitaker, T.J. (Pacific Northwest Laboratory, Box 999, Richland, Washington 99352). **11**: No. 7, 422-424(Jul 1986). Contract AC06-76RL01830.

Sequential photon-excitation, electron-impact ionization with subsequent mass analysis has been applied to a barium atomic beam. High-resolution, Doppler-free laser excitation produces the 6s-italic6p-italic ^{1}P-italic$_1$ excited state, which is then ionized by elec-

tron bombardment. The excited state is selectively ionized when bombardment energies are between the excited- and ground-state ionization thresholds. Mass discrimination has permitted the recording of individual optical spectra for all the stable isotopes, including the 0.1% abundant /sup 130/Ba and /sup 132/Ba, in a sample with natural isotopic abundances.

48089 **Studies of alkali metal interactions with chemisorbed CO on Ni(111).** Uram, K.J.; Ng, L.; Yates, J.T.; Folman, M. (Surface Science Center, Dept. of Chemistry, Univ. of Pittsburgh, Pittsburgh, PA). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 295-306(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

Recent vibrational studies of CO and alkali metals coadsorbed on various transition metal surfaces have measured C-O stretching frequencies far below that observed on most clean metal surfaces. HREELS results from CO and potassium coadsorbed on Pt(111) suggest the presence of long range CO-potassium interactions. Recently, C-O vibrational frequencies characteristic of known alkali-CO ionic complexes have been reported for CO coadsorbed with potassium on Cu-(110), and are representative of short-range interactional effects. Long range interactions are observed at low potassium coverages while short range interactions are observed at high potassium coverages. All of the vibrational measurements reported to date for CO-alkali interactions have involved spectroscopic resolution which is low (between 40 and 80 cm^{-1}). In this paper, the authors clearly distinguish both short range and long range interactions for CO and potassium coadsorbed on Ni(111) at both low and high potassium coverages using Infrared Reflection-Absorption Spectroscopy (IRAS) at a resolution of $7cm^{-1}$.

48090 **Hazardous waste analysis by direct-linked fused silica capillary column gas chromatography/fourier transform infrared/mass spectrometry.** Gurka, D.F.; Titus, R. (Environmental Protection Agency, Las Vegas, NV). pp 17-23 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A capillary gas chromatography/Fourier transform infrared (GC/FT-IR) spectrometer has been linked to a Mass Selective Detector (MSD). A 10:1 effluent splitter was used to divert most of the GC effluent to the FT-IR cell and the remainder to the MSD. This system has been used to characterize the GC-volatile portion of dye and herbicide manufacturing wastes, sediments, and sludge extracts. Use of a 2300 member FT-IR spectral data base, in conjunction with the NBS mass spectral (MS) data base, greatly increases the number of on-line MS confirmations obtainable by this direct-linked system over that of the conventional EPA GC retention time method. Chromatographic separation on a single capillary GC column allows a direct one-to-one correlation of peaks in the FT-IR and MSD chromatograms. Although this MS detector is 10 to 100 times more sensitive than the FT-IR detector used, and although the MS search library is over 15 times larger than the FT-IR search library, for the samples analyzed it was determined that each detector provided approximately the same amount of useful structural data.

48091 **Use of FTIR for automated identification of organic compounds frequently found on hazardous waste sites.** Puskar, M.A.; Levine, S.P.; Geraci, C.L.; Lowry, S.P. (Univ. of Michigan, Ann Arbor). pp 25-32 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An automated direct mixture identification FTIR program, PAWMI, which is ruled based in format, was developed as a preliminary screening tool for unknown organics handled on remedial action sites. This program, combined with forward searching through a library of spectra, result in the ability to identify major volatile components of organic waste and possibly nonchromatographable components of interest. A hazardous waste sample, previously analyzed by GC-MS, was used as a demonstration of the two FTIR techniques abilities. The data generated by FTIR and GC-MS are compared.

48092 **Tandem mass spectrometer for the detection of nitroaromatic compounds and other electronegative species in ambient air.** Glish, G.L.; McLuckey, S.A.; McKown, H.S. (Oak Ridge National Lab., TN). pp 33-40 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A tandem mass spectrometer has been constructed consisting of a quandrupole mass filter followed by a time-of-flight mass spectrometer. Ions are generated in an atmospheric pressure ionization (API) source, which allows for detection of certain types of compounds in ambient air. The combination of API with this tandem mass spectrometer offers the potential to do real-time monitoring of targeted compounds that are of environmental and other concern.

48093 **Computer-controlled system for rapid soil analysis of ^{226}Ra.** Doane, R.W.; Berven, B.A.; Blair, M.S. (Oak Ridge National Lab., TN). pp 47-54 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A computer-controlled multichannel analysis system has been developed by the Radiological Survey Activities (RASA) Group at Oak Ridge National Laboratory (ORNL) for the Department of Energy (DOE) in support of the DOE's remedial action programs. The purpose of this system is to provide a rapid estimate of the ^{226}Ra concentration in soil samples using a 6 x 9-in. NaI(Tl) crystal containing a 3.25-in. deep by 3.5-in. diameter well. This gamma detection system is controlled by a mini-computer with a dual floppy disk storage medium, line printer, and optional X-Y plotter. A two-chip interface was also designed at ORNL which handles all control signals generated from the computer keyboard. These computer-generated control signals are processed in machine language for rapid data transfer and BASIC language is used for data processing.

48094 **Laboratory experience in the analysis of orphan waste.** Leventhal, L.; Kharkar, D.P. (EAL Corp., Richmond, CA). pp 55-60 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Energy related low level radioactive waste mixed with inorganic and organic hazardous waste derive from all stages of the fuel cycle. In order to comply with EPA and NRC regulations, prior to disposal this waste must be analyzed. For the analytical laboratory, the samples comprise both a potential radiation and chemical hazard. Screening procedures for handling such samples are described. Sophisticated instrumentation is necessary to identify the contaminants with the sensitivity required by the EPA and NRC. Aliquotting and dilution techniques have been adequate to reduce the activity levels sufficiently to allow operations in an uncontrolled laboratory and meet the minimum detection levels. Higher level samples are analyzed in a controlled area employing dedicated instrumentation and health physics precautions.

48095 **New laboratory robotic system for automated sample preparation and integrated analysis.** Cerino, A.; Barrett, P.; Fisher, C.; McGrattan, B. (Perkin-Elmer Corp., Norwalk, CT). pp 63-75 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

For every sample that enters an analytical laboratory, a sequence of processes are performed. Comprehensive sample handling usually involves more than just analytical measurement and data handling. In most cases, some levels of sample preparation prior to the introduction to an analytical instrument is required. This preparation can be a simple dilution or a multistep procedure

that can be time consuming and tedious. Until recently, sample preparation has been performed manually. These sample preparation procedures have been the missing element in the concept of total laboratory automation. The paper will present a new approach for automated sample preparation and integrated analysis. The system employed is based on the concept of flexible automation. It utilizes a 5-axis articulated arm with programmable speed and interchangeable fingers to physically move samples around the sample preparation area. The robot is controlled by an IBM Personal Computer in conjunction with a high-level robot programming language. This menu-driven software provides flexibility with its modular and extendable design. The system allows customized applications to be easily developed. Featured in the discussion will be an integrated method including preparation and analysis for a typical gas chromatography sample. The routines that will be demonstrated will be suitable to a wide variety of applications.

48096 **Aluminum, boron, and mercury measurement via ion-exchange direct current argon plasma (DCAP) spectrometry.** Maxwell, S.L. III. (E.I. du Pont de Nemours and Co., Aiken, SC). pp 77-82 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC09-76SR00001.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The accurate measurement of aluminum, boron, and mercury in process dissolver solutions at the Savannah River Plant (SRP) is important. Costs for the processing of non-SRP uranium fuels are based in part on the measured aluminum content of the fuel. Boron is a nuclear safety control in some dissolutions and mercury(II) is a catalyst in the dissolution of uranium-plutonium oxide fuels. In analyses, ion exchange is used for selective separations and for removing high activity constituents in dissolver solutions prior to measurement via direct current argon plasma (DCAP) spectrometry. Aluminum is separated via anion exchange using oxalate-hydrochloric acid mixtures, boron is separated via cation exchange using 0.05 M nitric acid, and mercury(II) is separated via cation exchange using 40% ethanol-0.2 M hydrochloric acid. The aluminum content is measured with a precision of better than +- 1.0% (RSD) using gravimetric dilutions and sample measurements bracketted by standard measurements. Boron and mercury are measured with a precision of better than +- 3.0% (RSD) using volumetric dilutions.

48097 **Automated electron microprobe.** Thompson, K.A.; Walker, L.R. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN). pp 83-89 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The Plant Laboratory at the Oak Ridge Y-12 Plant has recently obtained a Cameca MBX electron microprobe with a Tracor Northern TN5500 automation system. This allows full stage and spectrometer automation and digital beam control. The capabilities of the system include qualitative and quantitative elemental microanalysis for all elements above and including boron in atomic number, high- and low-magnification imaging and processing, elemental mapping and enhancement, and particle size, shape, and composition analyses. Very low magnification, quantitative elemental mapping using stage control (which is of particular interest) has been accomplished along with automated size, shape, and composition analysis over a large relative area.

48098 **Automated instrument for qualitative analysis of photographically recorded spectra.** Hareland, W.A.; Melgaard, D.M. (Sandia National Labs., Albuquerque, NM). pp 91-98 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC04-76DP00789.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An advanced technique has been developed for the identification of element spectral lines in photographically recorded emission spectra. It is based on measurement of the relative position of a line on the photoplate and calculation of the wavelength using an equation derived from measured positions of known spectral lines. With this technique, the wavelength of any line can be determined to within 0.04 Angstrom over a 1000 Angstrom region. The elements are identified by comparing the calculated wavelengths with known values in the MIT Wavelength Tables and verified based on the wavelengths of the most intense spectral lines. The automated instrument can be applied to the analysis of photographically recorded spark source mass spectra. Isotopes can be identified based on their mass-to-charge ratios which are calculated from the measured positions of the lines on the photoplate.

48099 **Polymer mass spectrometry: the problem ad its solution.** Cook, K.D.; Callahan, J.H.; Man, V.F.; Hool, K.O. (Univ. of Tennessee, Knoxville). pp 101-106 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Electrohydrodynamic mass spectrometry (EHMS) has been used as a particularly soft ionization technique to characterize the molecular weight distributions of polymers. Several factors can affect the efficiency of sampling ions from solution (as in EH, FAB, and thermospray MS). Important variables include ion pairing, charge, solvation, desolvation, diffusion, and surface activity. These may vary significantly among oligomers, thereby complicating quantitative interpretation of polymer mass spectra obtained by matrix assisted ionization. The extent of this variation will be considered, along with means for minimizing its impact. The relative magnitude of the various contributions to sampling bias will be discussed.

48100 **Sputter atomization/resonance ionization mass spectrometry for high sensitivity isotopic analysis.** Donohue, D.L.; Christie, W.H.; Goeringer, D.E.; Smith, D.H.; McKown, H.S. (Oak Ridge National Lab., TN). pp 113-118 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Resonance Ionization Mass Spectrometry (RIMS) combines the selectivity and sensitivity of resonance ionization spectroscopy (RIS) with high performance mass spectrometry. Results from our laboratory (1-5) and elsewhere (6-13) have been reported for a variety of elements using thermal vaporization sources to produce the atom reservoir for laser-induced resonance ionization. In this paper we describe the use of ion beam sputtering as an ultrasensitive method of atom formation for RIMS (14). A commercial ion microprobe mass analyzer (IMMA) has been interfaced with a tunable pulsed dye laser for carrying out resonance ionization mass spectrometry of sputtered atoms. This paper will describe the changes necessary to adapt the IMMA instrument for resonance ionization, along with preliminary results for the elements Sm and U.

48101 **Evaluation of the MAT-thermal ionization quadrupole mass spectrometer for potential use for on-situ safeguards verifications.** Fiedler, R. (International Atomic Energy Agency, Seibersdorf, Austria). pp 127-132 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The Thermoquad THQ of Finnigan MAT is a quadrupole mass spectrometer with a Faraday cup and a secondary electron multiplier. The multiplier is placed at an angle of 90 degrees to the axis of the quadrupole rods. The sample size was for solution loadings 1/μg of uranium. Resin bead loadings carry about 2 ng of sample material. Both types of loadings have been used to test the instrument. The accuracy as well as the internal and external precision have been studied on standards and real samples. The possibilities as well as the limitations of the instrument are discussed with regard to its potential use for on-site safeguards verification measurements.

48102 **ICP-MS and its application in a nuclear laboratory.** Long, S.E.; Brown, R.M. (AERE Harwell, England). pp 133-137 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Combination of the Inductively Coupled Plasma Source (CIP) with a quadrupole mass spectrometer (MS) has produced a sensitive, multi-element analytical technique (ICP-MS) which complements the capabilities of other methods and produces isotope ratio data in addition to total element concentration. One such commercial instrument is being evaluated at Harwell. Experience with the technique will be discussed and factors such as sensitivity, precision and accuracy compared with that of other techniques, particularly ICP-ES. Emphasis is placed on a number of applications of the technique to problems associated with the nuclear industry. These include the determination of uranium in environmental samples, measurement of isotope ratios and the determination of impurities in alloys.

48103 **Application of inductively coupled plasma mass spectrometry to the analysis of uranium metal and uranium compounds.** Cantle, J.E. (VG Instruments, Stamford, CT). pp 139-142 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The analysis of trace impurities in uranium and its compounds has now become a routine requirement in all parts of the nuclear industry. Optical emission spectroscopy is used extensively to provide this analytical need for those elements for which suitable emission wavelengths exist. In many cases, however, pre-analytical chemical preparation steps must be taken such as separation of the uranium matrix, in order to avoid serious interferences. We have recently been investigating the potential of ICP-MS in this field of application. This technique shows much lower limits of detection in solution compared to OES, and moreover the mass spectra produced are simpler than optical spectra and are therefore easier to interpret. This paper will report on progress and failures so far, and will attempt to anticipate some of the future expectations.

48104 **Analytical applications of ICP-FTS.** Faires, L.M.; Palmer, B.A.; Cunningham, P.T. (Los Alamos National Lab., NM). pp 145-150 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The Analytical Chemistry Group of the Chemistry Division at Los Alamos National Laboratory has been investigating the analytical utility of the inductively coupled plasma (ICP) - Fourier transform spectrometer (FTS) combination. While a new state-of-the-art FTS facility is under construction at Los Alamos, preliminary data has been obtained on the one-meter FTS at the National Solar Observatory at Kitt Peak, Arizona. This paper presents an update of the Los Alamos FTS facility, which is expected to be completed in 1986, and presents data showing the analytical potential of an ICP-FTS system. Some of the potential problems of the multiplex disadvantage are discussed, and the advantages of the high resolution obtainable with the FTS are illustrated.

48105 **Electronic fourier transform spectroscopy: performance and application.** Bostick, W.D.; Armstrong, D.P.; Fletcher, W.H.; McCulla, W.H. (Oak Ridge Gaseous Diffusion Plant, TN). pp 151-158 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Recent advances in commercial instrumentation have extended the powerful technique of Fourier transform spectroscopy into the ultraviolet and visible spectral region, with inherent advantages which include: simultaneous multiwavelength detection, internal wavelength calibration, and adjustable resolving power. Performance with the Bomem DA3.01 instrument is examined by measurement of the visible emission produced by Ne and Hg calibration lamps and by continuous-wave HeNe, Ar^+, and tunable dye lasers.

48106 **Matrix isolation versus the light pipe as an interface for gas chromatography/fourier transform infrared spectrometry.** Schneider, J.F.; Demirgian, J.C.; Stickler, J.C. (Argonne National Lab., IL). pp 159-164 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract W-31-109-ENG-38.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Gas chromatography interfaced with Fourier transform infrared spectrometry (GC/IR) is a technique of rapidly growing importance in analytical chemistry. In this paper, the matrix-isolation interface for capillary GC/IR is compared with the light-pipe GC/IR interface. Gas chromatography/matrix-isolation/Fourier transform infrared spectrometry (GC/MI/IR) combines the separation power of capillary gas chromatography with the high sensitivity and specificity of matrix-isolation infrared detection. The results is a technique well suited to the detection and identification of trace quantities of organic compounds in complex samples. Representative spectra of a test mixture run on instruments using both interfaces are presented, and the advantages and disadvantages of both interfaces are discussed.

48107 **Comparison of different methods of determining plutonium content and isotopic composition.** pp 167-172 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC06-77RL01030.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

At Rockwell Hanford Operations, several different methods are used to determine plutonium content and isotopic composition. These include alpha particle energy analysis, calorimetry/gamma-ray analysis, mass spectrometry, and low energy gamma-ray assay. Each is used in a process control environment and has its advantages and disadvantages in terms of sample matrix, sample preparation, concentration, error ranges, detection limits, and turn around time. Of the methods discussed, special attention is paid to the Plutonium Isotopics Solution Counter, a low energy gamma-ray assay system designed to provide plutonium and americium content and isotopic composition of Pu-238 through Pu-241 and Am-241. It is qualitatively and quantitatively compared to the other methods. A brief description of sample types which the Solution Counter analyzes is presented.

48108 **High precision plutonium and uranium assay with an automatic titrator.** Sironen, R.J.; Angelo, T.B. (Rockwell International Corp., Golden, CO). pp 173-178 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

For a number of reasons it recently became advisable to adopt a different method for routine plutonium metal assay than had been in use at Rocky Flats. Earlier experience with the assay of plutonium nitrate solutions using a modified Corpel and Regnaud method had been highly successful. Subsequently the method was also successfully applied to plutonium metal and uranium metal assays. Consideration of automatic titration instrumentation led to the acquisition of a Mettler DL40 titrator. Precisions are typically less than .03% RSD with negligible bias. Assay methods and instrument operation are discussed.

48109 **Computer-assisted controlled-potential coulometer for the determination of plutonium.** Mitchell, W.G.; Lewis, K. (New Brunswick Lab., Argonne, IL). pp 179-184 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A computer controlled coulometer for maintaining the New Brunswick Laboratory's (NBL) state-of-the-art method of plutoni-

um determination has been designed, assembled, and tested. The new coulometer, designed and built at NBL, replaces the modified M-T Electronics Co., Model 3, coulometer which is no longer commercially available. The new instrument incorporates the basic features of the NBL controlled-potential coulometric method for the determination of plutonium. Continuous electrical calibration gives factors with a RSD of better than calibration gives factors with a RSD of better than 0.002%. A comparison study of the original and new coulometers using a one way analysis of variance test for factor effect shows no statistically significant difference between the two instruments.

48110 **Spectrophotometric determination of plutonium with high precision and heavy sample throughput.** pp 185-190 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

With increased requirements for process control and accountability of nuclear materials in plutonium processing plants, this plutonium assay method was developed which has the capability of handling heavy sample loads and still provide precise results. Plutonium nitrate solutions are added to a solution of 2 M hydrochloric acid containing hydroxylamine. The plutonium content of solutions is determined by measuring light absorbances. It takes only 1 1/2 to 2 hours to analyze six samples. Plutonium standard recoveries better than 100.00% +- 0.025% at two sigma are possible with recoveries better than 100.0% +- 1.0% in routine operation.

48111 **Nondestructive assay of plutonium residue in horizontal storage tanks.** Marsh, S.F. (Los Alamos National Lab., NM). pp 191-196 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract W-7405-ENG-36.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Aqueous plutonium recovery and purification processes often involve the temporary storage of plutonium solutions in holding tanks. Because plutonium is known to precipitate from aqueous solutions under certain conditions, there is a continuing need to assay emptied tanks for plutonium residue. A portable gamma spectrometer system, specifically designed for this purpose, provides rapid assay of such plutonium residues in horizontal storage tanks. A means is thus available for the nondestructive analysis of these tanks on a regular schedule to ensure that significant deposits of plutonium are not allowed to accumulate.

48112 **Multi-stage mass spectrometry with a quadruople mass filter interfaced to a high resolution sector mass spectrometer.** McBay, E.H.; Glish, G.L.; McLuckey, S.A.; Bertram, L.K. (Oak Ridge National Lab., TN). pp 199-203 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A new tandem mass spectrometer has been constructed by interfacing a quadrupole mass filter to the front end of a conventional high resolution sector mass spectrometer. The resulting instrument, the first of its kind, offers a number of useful and, in some cases, new capabilities. These include, for example, high mass resolution on daughter ions, variable collision energy collisional activation, ion/molecule reactions at superthermal energies and a variety of multiple reaction experiments. These capabilities have been demonstrated, examples of which are shown and discussed.

48113 **On-line analysis of plutonium by energy dispersive x-ray fluorescence.** Parray, R.F.; Walker, V.W.; Johns, R.A.; Camp, D.C.; Ruther, W.D.; Eckels, D. (Savannah River Lab., Aiken, SC). pp 205-210 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC09-76SR00001.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An on-line energy dispersive K x-ray fluorescence analysis (XRFA) system has been developed to measure the plutonium concentration of process solutions at the Savannah River Plant (SRP). This system has consistently produced accountability quality measurements (< 0.5%) on-line in ~ 40 minutes of counting time. Comparisons to an independent coulometry method show agreement within sampling and analysis precision, typically 1%.

48114 **On-line analyzer for monitoring uranium and technetium in the vent stacks to a gaseous diffusion plant.** Powell, M.R.; Branam, D.A.; Morrow, R.W. (Oak Ridge Gaseous Diffusion Plant, TN). pp 211-217 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An automated electrochemical analyzer to provide continuous on-line measurement of volatile uranium and technetium compounds in the vents of a gaseous diffusion plant has been developed. The analyzer uses square wave polarography to measure uranium and technetium concentrations in an alkaline solution that has been used to scrub a known volume of the diffusion cascade vent gases. Uranium can be determined down to 0.12 μg/mL solution sensitivity (0.093 μg/L gas sensitivity at a flow rate of 4 L/min and a sampling time of 30 min), and technetium can be determined to concentrations of 0.018 μg/mL (0.014 μg/L).

48115 **Imaging detector for X and gamma rays.** McGonnagle, W.J. (New Brunswick Lab., Argonne, IL). pp 219-224 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A unique component of this imaging detector is the microchannel plant (MCP) electron multiplier. Electron multiplication of 10^3-10^7 can be obtained using MCP's. The image can be observed visually, recorded on film, measured quantitatively by use of photodiode arrays or low level TV cameras. This detector can be used to image distributed sources such as containers of radioactive materials, and hold up in pipes or equipment. Provided with a point source of radiation it can be used for fluoroscopy or real time radiography. Applications, both qualitative and quantitative, in nuclear applications, safeguards, medicine, industry and x-ray diffraction are presented.

48116 **Production and certification of an equal atom plutonium isotopic standard - the New Brunswick Laboratory certified reference material (CRM) No. 128.** Cacic, C.G.; Crawford, D.W. (New Brunswick Lab., Argonne, IL). pp 231-238 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The US Department of Energy (DOE), New Brunswick Laboratory (NBL) has produced an equal atom $^{239}Pu/^{242}Pu$ isotopic standard, NBL CRM No. 128. Provisional certification of this standard relative to uranium was completed in 1984 and the material made available for distribution to the nuclear community. Certification of the $^{239}Pu/^{242}Pu$ ratio on an absolute basis has now been accomplished using highly accurate and precise chemical and mass spectrometric measurement techniques. The absolute certification of NBL CRM No. 128 has established it as the primary reference for calibrating the measurement of plutonium isotopic ratios.

48117 **Multi-column step-gradient chromatography system for automated ion exchange separations.** Rucker, T.L. (Oak Ridge National Lab., TN). pp 239-245 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A multi-column step-gradient chromatography system has been designed to perform automated sequential separations of radionuclides by ion exchange chromatography. The system consists

of a digital programmer with automatic stream selection valve, two peristaltic pumps, ten columns, and a fraction collector. The automation allows complicated separations of radionuclides to be made with minimal analyst attention and allows for increased productivity and reduced cost of analyses. Results are reported for test separations on mixtures of radionuclides by the system.

48118 **Robotic sample preparation for radiochemical plutonium and americium analyses.** Stalnaker, N.; Beugelsdijk, T.; Thurston, A.; Quintana, J. (Los Alamos National Lab., NM). pp 247-250 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract W-7405-ENG-36.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A Zymate robotic system has been assembled and programmed to prepare samples for plutonium and americium analyses by radioactivity counting. The system performs two procedures: a simple dilution procedure and a TTA (xylene) extraction of plutonium. To perform the procedures, the robotic system executes 11 unit operations such as weighing, pipetting, mixing, etc. Approximately 150 programs, which require 64 kilobytes of memory, control the system. The system is now being tested with high-purity plutonium metal and plutonium oxide samples. Our studies indicate that the system can give results that agree within 5% at the 95% confidence level with determinations performed manually.

48119 **Laser fluorimeter for uranium detection in waste.** Schoof, S.; Mainka, E.; Hellmund, E. (Institut fuer Radiochemie, Germany, F.R.). pp 251-259 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A laser fluorimeter will be described which was built to determine the concentration of uranium and possibly other elements in waste arising in reprocessing plants. It is possible to measure with this fluorimeter both active samples in a glovebox and inactive samples outside. Recording and subsequent handling of measured data is fully automated by use of a personal computer. The fluorimeter is suited to record fluorescence spectra and fluorescence decay curves. Concentration of fluorescing materials can be determined even in the presence of fluorescence quenchers. First results show that uranium concentrations down to 0.5 ppb can be measured when uranium is excited in the form of a phosphate complex. The influence exerted by various quenchers found in waste on the uranium fluorescence decay and on uranium concentration measurements was investigated.

48120 **Design and application of a new data system: DS90.** Warburton, G.A.; Rayn, P.A.; Chadwick, K.; Greathead, R.J. (Kratos Analytical, Manchester, England). pp 261-262 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

DS90 MS data system is a versatile control, acquisition and processing system. It incorporates facilities to allow operation of either magnetic sector or quadrupole instruments - including multi sector or hybrid instruments. Full control of a LC/GC-MS-DS is provided by distributed microprocessors, accessed and controlled through DS90. Presented here are some novel aspects of DS90 control and acquisition as well as data to illustrate the post-acquisition data handling facilities.

48121 **Detecting isotopic ratio outliers.** Bayne, C.K.; Smith, D.H. (Oak Ridge National Lab., TN). pp 265-273 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An alternative method is proposed for improving isotopic ratio estimates. This method mathematically models pulse-count data and uses iterative reweighted Poisson regression to estimate model parameters to calculate the isotopic ratios. This computer-oriented approach provides theoretically better methods than conventional techniques to establish error limits and to identify outliers.

48122 **Investigations of fluctuations in instrumental responses by principal components analysis.** Wangen, L.E.; Bentley, G.E.; Hamilton, V.T.; Peterson, E.J. (Los Alamos National Lab., NM). pp 285-291 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Principal components analysis was evaluated as a chemometric method for investigating the sources of variation in multicomponent analytical instruments. Many measurements of a 20-element standard were made over several days of operation with a direct-current argon plasma emission spectrometer designed to simultaneously measure the emission intensity at 20 analytical wavelengths. The number of components necessary to account for signal variations and the interelement correlations were determined by a principal components analysis. These results were used to identify the minimum number of independent sources of instrument variation and therefore the minimum number of internal standards need to correct nonrandom fluctuations in instrument response. Correlations of the analytical signals with the principal components provide guidance for selecting internal standards.

48123 **Optimization and experimental design in analytical chemical methods development.** Deming, S.N. (Univ. of Houston, TX). pp 293-297 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Most analytical chemical methods development requires the optimization of a response (e.g., analytical sensitivity) as a function of several experimental variables (factors: e.g., pH, reagent concentration, temperature). For many analytical chemical methods involving continuous factors, the sequential simplex technique has been found to be a highly efficient experimental design strategy that gives improved response after only a few experiments. After the sequential simplex technique has found the region of optimum response, classical experimental designs and regression analysis of the results provides detailed information about factor effects and interactions. An additional benefit of simplex optimization followed by classical experimental designs involves quality control: methods that have been optimized tend to operate in flat regions of the response surface. This flatness gives greater immunity to factor variations and greatly increases the ruggedness of the methods.

48124 **Real-time analysis using the Kalman filter.** Brown, S.D. (Washington State Univ., Pullman). pp 299-307 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract FG06-84ER13202.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Recent trends in analytical sensor development have created considerable interest in on-line methods of chemical analysis, where chemical species concentrations are estimated in real time. The Kalman filter is an ideal means by which the analysis of these data can be accomplished, and, if desired, some type of control loop implemented. However, there are many different approaches to Kalman filtering; not all are well-suited to rapid and accurate analysis of chemical data. This paper discusses factors which determine what algorithm should be employed, and it demonstrates the feasibility of real-time filtering by analyzing spectral data obtained on a reacting system.

48125 **Application of ICP/MS in the analysis of uranic materials.** Allenby, P.; Clarkson, A.S.; Makinson, P. (British Nuclear Fuels plc, Lancashire, England). pp 317-323 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An Inductively Coupled Plasma mass spectrometer, the Vacuum Generators (VG) PlasmaQuad is being evaluated for the determination of metallic impurities in uranic materials. This paper describes the problems encountered and gives instrumental conditions for the direct determination of Ti, V, Zr, Nb, Mo, Ru, Sb, Hf, Ta and W in uranyl nitrate liquors. Limits of detection for different nebulizer systems are quoted. These are compatible with the USDOE specification limits for these impurities in uranium hexafluoride.

48126 **Reversed phase chromatographic separations with tri-n-octyl phosphine oxide for the isotopic and isotope dilution analysis of mixed U, Pu nuclear fuel materials.** Delle Site, A.; Doubek, N.; Fiedler, R.; Raab, W.; Swietly, H.; Bagliano, G.; Deron, S. (International Atomic Energy Agency, Seibersdorf, Austria). pp 325-335 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Accountability and safeguards verification analyses of mixed uranium-plutonium nuclear materials require that practical and efficient procedures be available for selective separations of americium, plutonium and uranium. A reversed phase procedure was defined for the analysis of mixed U, Pu nuclear reactor fuel materials is described, using a single column for the successive separation of the elements of interest by reverse phase chromatography on a stationary phase of tri-n-octyl phospine oxide. The procedure is suitable for the complete isotopic analyses of plutonium and uranium by mass spectrometry, the determination of the isotope abundances of Pu-238 by alpha spectrometry, as well as for the isotope dilution assays of plutonium and uranium. Results of tests, performed in particular with reference materials, indicate that the separation allows to achieve the ESARDA-1983 target values of precision and accuracy. Limitations of the procedure are discussed.

48127 **Description of apparatus for determining radiological source terms of nuclear fuels.** Baldwin, D.L.; Woodley, R.E.; Holt, F.E.; Archer, D.V.; Steele, R.T.; Whitkop, P.G. (Westinghouse Hanford Co., Richland, WA). pp 345-351 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

New apparatus have been designed, built and are currently being employed to measure the release of volatile fission products from irradiated nuclear fuel. The system is capable of measuring radiological source terms, particularly for cesium-137, cesium-134, iodine-129 and krypton-85, in various atmospheres at temperatures up to 1200 degrees C. The design allows a rapid transient heatup from ambient to full temperature, a hold at maximum temperature for a specified period, and rapid cooldown. Released fission products are measured as deposition on a platinum thermal gradient tube or in a filter/charcoal trap. Noble gases pass through to a multichannel gamma analyzer.

48128 **Automated analyzer for the determination of free acid.** Young, J.E.; Maxwell, S.L. III. (Savannah River Lab., Aiken, SC). pp 353-357 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC09-76SR00001.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The determination of nitric acid concentration is essential for virtually every phase of nuclear fuel reprocessing operations. Baumann and Torrey have developed a manual method for the determination of free acid in the presence of hydrolyzable metal ions such as Al(III), Cr(III), Fe(III), Hg(II), Ni(II), Th(IV), and U(VI). Potassium thiocyanate complexes these ions to prevent interference in the standard addition method. The manual method has been used in our laboratory with great success. This paper presents a fully automated system for free acid determination which improves overall precision and significantly reduces the time of analysis. When compared to the manual method, precision is improved from +/- 8.0% to +/- 5.2% (2 RSD) for the 47-member technician pool. Hands-on analytical time is reduced from 5 minutes to 1 minute per sample. Precision for a single chemist performing the analysis is +/- 0.7%. The method has been implemented for routine Purex process control. Analyzers have been installed in both shielded cell and bench locations.

48129 **Method for the recovery of silver from silver zeolite.** Reimann, G.A. (to Dept. of Energy). US Patent Application 6-708,618. 5 Mar 1985. 15p. Contract AC07-76ID01570. DE86013783 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013783.

High purity silver is recovered from silver exchanged zeolite used to capture radioactive iodine from nuclear reactor and nuclear fuel reprocessing environments. The silver exchanged zeolite is heated with slag formers to melt and fluidize the zeolite and release the silver, the radioactivity removing with the slag. The silver containing metallic impurities is remelted and treated with oxygen and a flux to remove the metal impurities. About 98% of the silver in the silver exchanged zeolite having a purity of 99% or better is recoverable by the method.

48130 **Laser-induced fluorescence of europium-doped yttrium oxide for remote high-temperature thermometry.** Cates, M.R.; Allison, S.W.; Franks, L.A.; Marshall, B.R.; Noel, B.W. (Martin-Marietta Energy Systems, Oak Ridge, TN). pp vp of Proceedings of the international congress on applications of lasers and electro-optics. Toledo, OH; Laser Institute of America (1985). (CONF-8511103—).

From ICALEO international congress on the applications of lasers and electro-optics: San Francisco, CA, USA (11 Nov 1985).

The refractory material Y_2O_3, doped with Eu is one of a class of materials that show striking temperature dependence in the decay time of photon emissions from the excited dopant in the lattice. The strong emission line at about 612 nm has a decay time versus temperature profile that exhibits a marked logarithmic dependence starting at about 700°C, and continuing toward eventual extinction.

48131 **New detection methods and techniques with applications in liquid chromatography.** Wilson, S.A. Ames, IA; Iowa State Univ. (1985). 109p. University Microfilms Order No. 86-04,531.Contract W-7405-ENG-82.

Thesis (Ph. D.).

Improvements in instrumental techniques for use in liquid chromatography (LC) used in detection and in the methods by which detectors are used to obtain information are reported. Results of two projects in which new detection techniques are demonstrated are described. Both of these techniques take advantage of the unique properties of lasers as light sources. The first technique is a laser-based three-dimensional detector which allows simultaneous monitoring of the refractive index, absorbance, and fluorescence from a flowing stream. Using the laser's ability to be focused to a very small spot, a one-microliter cell was built allowing compatibility with microbore column LC. The second technique is a laser-based absorbance detector which allows one to make differential absorbance measurements, optically using Michelson interferometry. A novel detection method is shown to work with two common LC detectors: the absorbance detector and the electrical conductivity detector. The absorbance detector works as a universal detector when an absorbing eluent is used, allowing one to detect nonabsorbing analytes. This mode of detection, along with the new detection scheme, is shown to allow analytes to be quantified without the need for standards. The same detection scheme is demonstrated with the conductivity detector, with nonsuppressed ion chromatography.

48132 **Photochemical separation of metals in aqueous solution.** Donohue, T. (Naval Research Lab., Washington, DC). *Chemical Physics Letters;* **48**: No. 1, 119-121(15 May 1977). Contract AI01-76ET32016.

Several d-block transition elements have been separated from mixtures by photochemical means, using lines from various lasers. The species involved, oxalato complexes of Fe and Co, exhibit selective photoreduction following absorption in bands in the visible and near ultraviolet regions of the spectrum. This experiment is apparently the first demonstration of selective laser photochemistry in

liquid phase mixtures of chemically related elements. 24 references, 1 figure, 1 table.

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REFER ALSO TO CITATION(S) 47369, 47370, 47371, 47865, 48024, 48078, 48085, 48171, 48204, 48205, 48207, 48326, 48674

48133 (CONF-851286—1) Pulsed EPR studies of small reactive radicals produced by ionizing radiation. Lawler, R.G. (Brown Univ., Providence, RI (USA). Dept. of Chemistry). 1985. Contract AC02-82ER12042. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013389.

From Symposium on magnetic resonanace of excited state molecules; Kyoto, Japan (21 Dec 1985).

For several years we have participated in a collaborative research effort to apply the pulsed EPR-pulse radiolysis technique to several problems associated with the dynamics of small reactive radicals formed during radiolysis of aqueous solutions using 3 MeV electrons from a Van de Graaff accelerator. We will discuss experimental techniques and applications arising from this work, with particular emphasis on problems requiring high initial radical concentrations and EPR time resolution of one microsecond or better. 2 figs., 2 tabs.

48134 (CONF-860620—10) Chemistry of isolated transition metal clusters. Riley, S.J.; Parks,; E.K.; Liu, K. (Argonne National Lab., IL (USA). Chemistry Div.). Jun 1986. Contract W-31109-ENG-38. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014559.

From Society of Photo-Optical Instrumentation Engineers international symposium: topics in optical and optoelectronic applied sciences and engineering; Quebec City, Canada (2 Jun 1986).

Clusters containing two to several hundred atoms are generated by pulsed laser vaporization of a metal target located in a flow tube reactor. A continuous flow of inert carrier gas entrains and cools the vaporized plume of metal, resulting in rapid cluster growth. Reactant gases are injected into the flow downstream of the target, at a point where cluster growth has finished. After reagent mixing and chemical reactions occur, the products exit the tube into a vacuum, and are formed into a molecular beam by collimators located in successive stages of differential pumping. In the highest vacuum stage the reaction products are identified by pulsed laser ionization and time-of-flight mass spectrometry. Studies to be discussed include measurements of absolute reaction rate constants, hydrogen uptake experiments, laser-induced desorption of adsorbates from clusters, and cluster-catalyzed chemical reactions. Such work provides us with information about the dependence of reactivity on cluster size, the geometrical configuration of cluster binding sites, the thermodynamics of adsorbate bonding, and the mechanisms of chemical reactions of cluster surfaces. These studies are bringing us closer to a detailed understanding of the interactions of metal surfaces with atoms and simple molecules.

48135 (DOE/ER/12016—1) Hydrothermal solubility of uraninite. Final technical report. Parks, G.A.; Pohl, D.C. (Stanford Univ., CA (USA). Dept. of Applied Earth Sciences). 20 Dec 1985. Contract AT03-82ER12016. 46p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014162.

Experimental measurements of the solubility of UO_2 from 100 to 300°C under 500 bars H_2, in NaCl solutions at pH from 1 to 8 do not agree with solubilities calculated using existing thermodynamic databases. For pH < 2, the observed pH dependence is similar to that predicted, but solubilities are higher than predicted by an order of magnitude or more. This is taken as evidence that a UO_2(hyd) has precipitated and is controlling solubility. For pH > 8, solubilities at all temperatures are much lower than predicted, suggesting that the U(OH)/sub δ/⁻ complex is much weaker than predicted. Extrapolated to 25°C, high pH solubility agrees within experimental error with the upper limit suggested by Ryan and Rai (1983). In the pH range 2 to 6, solubilities are up to three orders of magnitude lower than predicted for temperatures exceeding 200°C and up to two orders higher than predicted at lower temperatures. pH dependence in this region is negligible suggesting that $U(OH)_4$(aq) predominates, thus the stability of this species is higher than presently estimated at low temperatures, but the enthalpy of solution is smaller. A low maximum observed near pH ≃3 is presently unexplained. 40 refs., 16 figs., 12 tabs.

48136 (DOE/PC/60779—T2) Advanced NMR characterization of zeolite catalysts. Final technical report. Welsh, L.B.; Oldfield, E. (Allied-Signal, Inc., Des Plaines, IL (USA). Engineered Materials Research Center). Mar 1986. Contract FG22-83PC60779. 79p. NTIS, PC A05/MF A01; GPO Dep. File Number DE86014827.

The effort described in this report involved a joint industry-university program between the Signal Research Center, Inc., and the University of Illinois, designed to advance the state of knowledge of zeolite catalyst characterization technology for application to zeolite catalysts useful in coal liquefaction related processes. The program involved the application of new and improved high resolution solid state nuclear magnetic resonance (NRM) techniques to the characterization of zeolite catalysts and other related microporous materials. The NMR experiments were performed in the state-of-the-art NMR laboratory at the University of Illinois. In this report the first comprehensive investigation of ^{17}O NMR of A and Y zeolites by means of static, MASS and VASS (variable angle sample spinning) NMR techniques is presented. The determination of the ^{17}O isotropic chemical shifts, nuclear quadrupole coupling constants and electric field gradient tensor asymmetry parameters provides valuable supplementary information on zeolite structure. As an extension of the ^{17}O NMR investigation of zeolites, results for gallosilicates and for several aluminophosphate materials have also been obtained. The work presented in this study demonstrates the ability of using ^{17}O NMR to observe chemical changes in the oxygen environment of zeolites. This has important implications for the study of zeolite based catalysts. Chemical modifications of catalysts, such as framework substitutions or ion exchange which are commonly used to modify zeolite catalyst activity can be directly studied for their effect on the oxygen rich surface of the zeolite. It is also possible that this technique could be used to directly probe the interactions between the zeolite surface and reactant molecules. 29 refs., 14 figs., 7 tabs.

48137 (INIS-BR—490) Synthesis and growth of single crystals of $PrCl_3$. Pei, J.S. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)). 1984. 86p. (In Portuguese). NTIS (US Sales Only), PC A05/MF A01. File Number DE86703247.

An efficient method for growth of high optical quality single crystals of $PrCl_3$. The method consists in careful drying of the hydrated chloride, $PrCl_3 \cdot 7H_2O$, with a protective atmosphere of anhydrous HCl and Ar. A subsequent growth was done by the zone melting technique. The hydrated chloride had prepared from dissolution of the oxide Pr_6O_{11} in hydrochloric acid. The grown crystals had characterized fluorescence and x-ray diffraction measurements.

48138 (LA—10681) Preparation of fused chloride salts for use in pyrochemical plutonium recovery operations at Los Alamos. Fife, K.W.; Bowersox, D.F.; Christensen, D.C.; Williams, J.D. (Los Alamos National Lab., NM (USA)). Jul 1986. Contract W-7405-ENG-36. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014881.

The Plutonium Metal Technology Group at Los Alamos routinely uses pyrochemical processes to produce and purify plutonium from impure sources. The basic processes (metal production, metal purification, and residue treatment) involve controlling oxidation and reduction reactions between plutonium and its compounds in molten salts. Current production methods are described, as well as traditional approaches and recent developments in the preparation of solvent salts for electrorefining, molten salt extraction, lean metal (pyroredox) purification, and direct oxide reduction.

48139 (ZfI-Mitt—99) Report of the Central Institute for Isotope and Radiation Research. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung; Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania)). Dec 1984. 129p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86780479.

Separate abstracts were prepared for individual papers in this report.

48140 Zero-field NMR of small-amplitude motions in a polycrystalline solid. Millar, J.M.; Thayer, A.M.; Zax, D.B.; Pines, A. (Univ. of California, Berkeley). *Journal of the American Chemical Society;* **108**: No. 17, 5113-5116(20 Aug 1986). Contract AC03-76SF00098.

The librational motions of the water molecules in polycrystalline barium chlorate monohydrate have been studied by using proton and deuterium zero-field NMR. In contrast to high-field NMR, subtle molecular motions produce readily observable changes in the zero-field spectrum. Computer simulations and application of a novel-pulsed zero-field technique confirm that the splitting observed in the zero-field spectrum of the hydrate results from the motionally induced asymmetry of the magnetic dipole-dipole coupling tensor.

48141 Derivation of the density of states and distribution functions for two-level systems in glasses. Jankowiak, R.; Small, G.J.; Athreya, K.B. (Iowa State Univ., Ames). *Journal of Physical Chemistry;* **90**: No. 17, 3896-3898(14 Aug 1986).

A formalism for calculating the density of states (DOS) function for tunneling systems in amorphous materials is described. Gaussian distribution functions for the asymmetry (Δ) and the tunneling parameter (λ) are employed. It is shown that over a broad energy range (E << planck's constant omega$_0$) the DOS function is an increasing function of energy proportional to E/sup μ/sub eff// with $0.3 \leqq \mu/\text{sub eff/} \leqq 0.5$.

48142 Influence of surface phase transitions on desorption kinetics: the compensation effect. Estrup, P.J.; Greene, E.F.; Cardillo, M.J.; Tully, J.C. (Brown Univ., Providence, RI). *Journal of Physical Chemistry;* **90**: No. 17, 4099-4104(14 Aug 1986).

The authors discuss the origin of a compensation effect in thermal desorption kinetics that can arise from phase transitions in the adsorbate-substrate system. The authors demonstrate that the continuity of the chemical potential through a phase transition underlies this effect. They then cite specific examples in which a phase change in the adsorbate-substrate system produces compensating changes in the Arrhenius parameters that characterize the thermal desorption rate.

48143 Bottlenecks to unimolecular reactions and an alternative form for classical RRKM theory. Gray, S.K.; Rice, S.A.; Davis, M.J. (Univ. of Chicago, IL). *Journal of Physical Chemistry;* **90**: No. 16, 3470-3482(31 Jul 1986). Contract W-31-109-ENG-38.

Bottlenecks to the flow of phase points in the classical phase space of a triatomic molecule are discussed and approximated for the example of van der Waals predissociation of HeI_2. An alternative form for the usual transition-state theory of unimolecular reactions, RRKM theory, is developed by approximating the intermolecular (separatrix) bottleneck and using it as a basis for the transition-state surface. The rates obtained with the theory are in surprisingly good accord with dynamical rates form classical trajectory studies.

48144 New approach to quantum mechanical transition-state theory. Tromp, J.W.; Miller, W.H. (Univ. of California, Berkeley). *Journal of Physical Chemistry;* **90**: No. 16, 3482-3485(31 Jul 1986).

Classical transition-state theory is based on the direct, short-time (actually, zero time) classical dynamics through a dividing surface that separates reactants and products. This paper defines a new quantum mechanical version of transition-state theory by using the reactive flux correlation function of Miller, Schwartz, and Tromp [J. Chem. Phys. 1983, 79, 4889] to identify the short-time quantum dynamics through the dividing surface. It is seen that short time quantum mechanically is not zero time, as it is classically, but rather a time of order Planck's constantβ. This new quantum version of transition-state theory is also seen to have some of the variational character of the classical case. Finally, it is shown how the reactive flux correlation function of Miller, Schwartz, and Tromp can be generalized by choosing various forms of the projector onto reactants, and this is seen to have important consequences for the accuracy of this new quantum transition-state theory.

48145 Collision lifetime approach to recombination and a new derivation of RRKM theory. Bowman, J.M. (Illinois Institute of Technology, Chicago). *Journal of Physical Chemistry;* **90**: No. 16, 3492-3495(31 Jul 1986). Contract FG02-85ER13385.

The authors generalize the atom-atom recombination theory of Smith to describe atom-molecule systems. Expressions for the rate constants for bimolecular association and unimolecular dissociation are given in terms of appropriate thermal averages of the trace of the Smith collision lifetime matrix. The authors then apply standard transition-state theory and statistical assumptions to these collisional-based rate constants. The resulting expression for the rate constant for the association reaction is found to be the usual (variational) transition-state theory expression for a bimolecular reaction, and the expression for the dissociation of the complex is found to be the RRKM expression for unimolecular dissociation of a collision complex.

48146 Comparison of electron-transfer matrix elements for transition-metal complexes: t/sub 2g/ vs. e/sub g/ transfer and NH_3 vs. H_2O ligands. Newton, M.D. (Brookhaven National Lab., Upton, NY). *Journal of Physical Chemistry;* **90**: No. 16, 3734-3739(31 Jul 1986). Contract AC02-76CH00016.

Electron-transfer matrix elements are calculated for several pairs of transition-metal complexes of the type ML_6^{2+}-ML_6^{3+}, chosen so as to allow a comparison of t/sub 2g/(π) vs. e/sub g/(σ) transfer and NH_3 vs. H_2O ligands, primarily for the apex-to-apex orientation of reactants (M = Fe, Co, and Ru). The magnitude of the matrix element has a pronounced dependence on transfer type (e/sub g/ > t/sub 2g/) and ligand type (NH_3 > H_2O), an effect which is correlated with the degree of mixing of the metal and ligand orbitals, based on a corresponding orbital analysis. Use of the calculated matrix element for the $Co(NH_3)_6$/sup 2+/3+/ electron exchange, in conjunction with a semiclassical kinetic formalism and a spin-orbit attenuation factor, yields a rate constant for the ground-state reaction path which is about 2 orders of magnitude less than the experimental rate constant. (Orientational averaging would lower the calculated rate constant even further.)

48147 Phenomenological manifestations of large-curvature tunneling in hydride-transfer reactions. Kreevoy, M.M.; Ostovic, D.; Truhlar, D.G.; Garrett, B.C. (Univ. of Minnesota, Minneapolis). *Journal of Physical Chemistry;* **90**: No. 16, 3766-3774(31 Jul 1986). Contract AC02-79ER10425.

An important consequence of recent dynamical theories of tunneling is that, because of large curvature of the reaction path in a typical H, H^+, or H^- transfer, light-isotope transfer occurs in more extended nuclear frameworks than heavy-isotope transfer. This is incorporated here into a modified version of the Marcus phenomenological theory relating reaction rate constants to equilibrium constants. It leads to Bronested slope parameters that depend on the isotope transferred. The new theoretical formulation is tested on experimental data for hydride and deuteride transfer between nicotinamide adenine dinucleotide analogues and on computational data for hydrogen-atom and deuterium-atom transfer between pseudoatoms. The experimental kinetic isotope effects (KIE's) are shown to vary with reaction equilibrium constant (k/sub ij/) in a way that is quantitatively consistent with the theory. The critical configurations generated by the calculations vary from the saddle point and from each other in the way anticipated by theory. However, the calculated KIE values are a rather scattered function of K/sub ij/ because the tunneling corrections are large and somewhat system specific. Overall, the authors believe that this combination of experimental and calculated results provides considerable support for the idea that large-curvature tunneling needs to be considered in hydrogen-transfer reactions.

48148 Structure and chemisorptive properties of the Pt_3Ti surface. Bardi, U.; Dahlgren, D.; Ross, P.N. (Universita di Firenze, Italy). *Journal of Catalysis;* **100**: No. 1, 196-209(Jul 1986). Contract AC03-76SF00098.

Low-energy electron diffraction (LEED), X-ray photoelectron spectroscopy (XPS), and Auger electron spectroscopy (AES) were used to determine the structure and composition of the surfaces of [111] and [100] oriented crystals of an ordered alloy of bulk stoichiometry Pt_3Ti. Thermal desorption spectroscopy (TDS) was used to study the adsorption of carbon monoxide and hydrogen on these surfaces. The clean, annealed surface of [111] orientation has the ordered structure expected from truncation of the bulk crystal, consisting of alternating atom rows of (50% Pt + 50% Ti) and 100% Pt. The surface of [100] orientation also has a regular truncation structure with the outermost layer being 50% Ti in a c(2 x 2) lattice and the second layer, the 100% Pt layer. At near-ambient temperature, the adsorption of CO at the Ti sites is dissociative and at the Pt sites, molecular. The orderly substitution of Ti for Pt atoms in the surface changes the Pt-Pt pair site distribution such as to eliminate most of the sites for bridge bonding of the CO molecule. Only a single symmetric TDS peak was observed for CO desorbing from the alloy surface, as opposed to the asymmetric peak shape observed from pure Pt surfaces, which the authors suggest is a consequence of bridge-site elimination. At low temperature (230 K), a second molecular state of CO was observed which the authors assigned to a predissociative state on Ti sites with CO lying parallel to the surface. No hydrogen could be observed to desorb from clean annealed Pt_3Ti surfaces dosed with hydrogen at room temperature. Unfortunately, the authors were not able to distinguish between the possibilities (1) that hydrogen does not adsorb on the surface at room temperature, and (2) that hydrogen adsorbed at room temperature is not desorbed by flashing the surface temperature to ca. 900 K.

48149 Nitrogen desorption in the reaction of nitric oxide on carbon-supported platinum catalysts. Lim, K.J.; Loeffler, D.G.; Boudart, M. (Stanford Univ., CA). *Journal of Catalysis;* **100**: No. 1, 158-166(Jul 1986).

The catalytic decomposition of nitric oxide on carbon- and γ-alumina-supported platinum was studied in a quartz flow reactor between 423 and 623 K. The measured turnover frequency, defined as the number of nitric oxide molecules reacting per surface platinum atom per second, was an order of magnitude higher on the carbon-supported catalysts than on the alumina-supported catalyst or than that projected from earlier work on platinum foil. The rate-determining step for nitric oxide decomposition on Pt/Al_2O_3 or Pt foil appears to be the chemisorption of NO on platinum, with inhibition by oxygen, the most abundant reaction intermediate (mari) in equilibrated chemisorption on the same sites as those required for NO chemisorption. By contrast, it appears that on surrounding carbon support, producing CO and CO_2. The kinetic data suggest that the mari now consists of adsorbed nitrogen atoms. The second-order rate constant k for the associative desorption of nitrogen from platinum obtained for the work is compared with that extracted from published data on NH_3 decomposition or that measured directly by temperature-programmed desorption of nitrogen from platinum. It is found that for k a preexponential factor of 5×10^{-9} cm^2s^{-1} and an activation energy of 88 kJ mol^{-1}, in remarkable agreement with those reported by others.

48150 CO adsorption on (111) and (100) surfaces of the Pt_3Ti alloy: evidence for parallel binding and strong activation of CO. Mehandru, S.P.; Anderson, A.B.; Ross, P.N. (Case Western Reserve Univ., Cleveland, OH). *Journal of Catalysis;* **100**: No. 1, 210-218(Jul 1986). Contract AC03-76SF00098.

An atom superposition and electron delocalization molecular orbital (ASED-MO) study has been made of CO adsorption on a 40-atom cluster model of the (111) surface and a 36-atom cluster model of the (100) surface of the Pt_3Ti alloy. Parallel binding to high-coordinate sites associated with Ti and low CO bond scission barriers are predicted for both surfaces. The preference for parallel adsorption is a consequence of the nature of the CO π=to-surface donation interactions. On Ti sites the π orbitals donate to the early empty Ti 3d band and the antibonding counterpart orbitals are empty. Thus the π donation makes substantial contributions to the adsorption bond order that are in addition to the contributions from 5 σ donation and metal backbonding to the π/sup */ orbitals. Altogether these bonding interactions favor the lying down orientation. On Pt sites, on the other hand, the π donation antibonding counterpart orbitals are occupied so that the net interaction with Pt is a closed-shell repulsion. CO bonds upright in order to minimize the π interaction, and concomitantly, the closed-shell repulsion, while maintaining 5σ donation and π/sup */ backbonding stabilizations. Comparisons are made with the results for a 40-atom cluster model of the unalloyed Pt(111) surface. It is shown that the extended Hueckel parameterization is inappropriate for studying CO and adsorption to Pt with ASED-MO theory because it incorrectly favors adsorption bonding through the oxygen end.

48151 Thermodynamics of multicomponent, miscible, ionic systems: theory and equations. Pitzer, K.S.; Simonson, J.M. (Univ. of California, Berkeley). *Journal of Physical Chemistry;* **90**: No. 13, 3005-3009(19 Jun 1986). Contract AC03-76SF00098.

Equations of a type which has proven successful for binary and pseudobinary ionic systems miscible from dilute solution in polar solvent to the fused salt are extended to an indefinite number of components. The underlying theory is discussed as well as the optimum form for empirical terms. In brief, the equations comprise an ideal term, an extended Debye-Hueckel term, and a Margules expansion. The latter is carried out to the three-suffix level but could be extended. Relationships between molality and mole-fraction standard states are given. Examples are given showing the extent to which parameters measured for binary systems determine the properties of more complex systems.

48152 Thermodynamics of multicomponent, miscible, ionic systems: the system $LiNO_3$-KNO_3-H_2O. Simonson, J.M.; Pitzer, K.S. (Oak Ridge National Lab., TN). *Journal of Physical Chemistry;* **90**: No. 13, 3009-3013(19 Jun 1986). Contract AC03-76SF00098;AC05-84OR21400.

Vapor pressures of water over KNO_3-H_2O and $LiNO_3$-KNO_3-H_2O (50.34 cation % Li) are reported in the temperature range $373 \leqq T/K \leqq 436$. Water activities calculated from these vapor pressures and other available results are fitted to an equation appropriate for multicomponent electrolyte solutions which are miscible to fused salts. The resulting equation gives the excess Gibbs energy over the complete composition range of the three-component system. Parameters for the binary fused salt mixture are determined from aqueous solution data and compared with approximate values calculated from phase diagrams. Excess thermodynamic properties, including solute activity coefficients and excess enthalpies, are calculated from the model.

48153 Activity of water mixed with molten salts at 317°C. Weres, O.; Tsao, L. (Lawrence Berkeley Lab., CA). *Journal of Physical Chemistry;* **90**: No. 13, 3014-3018(19 Jun 1986). Contract AC03-76SF00098.

The authors have determined the activity of water in extremely concentrated solutions of individual salts and common ion ternary mixtures in the system Na^+-K^+-OH^--acetate-Cl^--H_2O at 317°C. The sodium salts of boric acid, phenol, propionic acid, benzoic acid, and toluenesulfonic acid were also studied. These solutions are relevant to water chemistry and corrosion control in the steam generator of a nuclear power plant. The data have been fitted by using the thermodynamic model of very concentrated salt solutions recently proposed by Pitzer and Simonson. The model is able to successfully represent the data in all cases, and allows salt activity coefficients to be calculated.

48154 Characterization of supercritical fluid solvents using solvatochromic shifts. Yonker, C.R.; Frye, S.L.; Kalkwarf, D.R.; Smith, R.D. (Pacific Northwest Lab., Richland, WA). *Journal of Physical Chemistry;* **90**: No. 13, 3022-3026(19 Jun 1986). Contract AC06-76RL01830.

Solvatochromic probe molecules, with absorbances in the UV region, were used to examine the cybotactic region of pure and mixed supercritical fluid solvent systems. This approach allowed determination of the relative polarity-polarizability of these fluids and comparison with conventional solvents. The position of maxi-

mum absorbance was seen to be density dependent. The solvatochromic shift for the most polar fluid studied, supercritical ammonia, was the most sensitive to changes in solvent density, and at moderate densities it approached that observed for tetrahydrofuran. Supercritical CO_2, N_2O, and CCl_3F showed smaller spectral shifts over a comparable density range. In mixed fluid solvents (CO_2-methanol) the spectral shift approached that seen for pure methanol as the percentage of methanol was increased.

48155 Rule of thumb for binary isotope separations in a gas centrifuge. Berger, M.H. (Oak Ridge Gaseous Diffusion Plant, TN). **21**: No. 4, 383-392(Jun 1986).

A simple hypothetical model of the binary isotope separation process in a modern countercurrent Gas Centrifuge is proposed. Like the usual Cohen-Onsager separation theory, internal fluid dynamics are obviously involved. But unlike that theory it completely obviates the flow integrals for Cohen's E, thereby allowing an immediate estimate of the flow efficiency of a given design by visual inspection of the flow field. At times this should be checked later by the usual analyses. To shed some light on this idea, derivations for two simple assumed idealized hydrodynamics are given, but a rigorous proof remains an open question. Then the hypothesis is tested against a battery of about 10 new exact formulas for E based upon analytical solutions to several variants of Onsager's pancake equation and is found to be reasonably accurate and surprisingly robust. Finally, some limitations of the rule are explored.

48156 The effect of catalyst preparation on catalyst activity. Huang, Y.-J.; Schwarz, J.A. (Dept. of Chemical Engineering and Materials Science, Syracuse Univ., Syracuse, NY). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 177-181(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

The authors describe the procedures used for catalyst preparation in this study. Three groups of Ni/Al_2O_3 catalysts with different nickel weight loadings were prepared. For each group of catalysts, the concentration of Ni in solution was the same, but the pH of the impregnating solution for each catalyst is different. The results of temperature-programmed reaction (TPR), steady-state CO hydrogenation, and temperature-programmed surface reaction (TPSR) for these catalysts will be presented elsewhere. The effect of the pH of the impregnating solution on the formation of different types of nickel catalyst precursors on the Al_2O_3 surface is discussed here. A wide range of pH's were used, but did not exceed the pH where precipitation of nickel hydroxide occurs.

48157 Surface chemistry of sulfur containing heterocyclic molecules on Mo (110). Roberts, J.T.; Friend, C.M. (Harvard University, Dept. of Chemistry, Cambridge, MA). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **31**: No. 1, 238-244(Mar 1986). (CONF-860425—).

From 191. American Chemical Society national meeting; New York, NY, USA (13 Apr 1986).

In this work, the authors report the reactivity of the three sulfur containing heterocycles, namely thiophene, 1, thiophane, 2 and trimethylene sulfide, 3, on clean Mo(110) under ultrahigh vacuum conditions. These studies were undertaken to compare the reactivity of Mo(110) to previously reported work on Mo(100) and to investigate the role of varying the degree of unsaturation and ring size of the reactant molecule in the desulfurization process. Thermal desorption used in conjunction with isotopic exchange is the primary tool used in these investigations. Low energy electron diffraction and Auger electron spectroscopy were also used to monitor surface order and composition, respectively.

48158 High-resolution cw resonance ionization mass spectrometry. Whitaker, T.J.; Cannon, B.D.; Bushaw, B.A. (Pacific Northwest Lab., Richland, WA). pp 107-112 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC06-76RL01830.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

We have used continuous-wave (cw) lasers to produce efficient, isotopically selective ionization of barium in the source region of a quadrupole mass spectrometer. The technique involves two low-power, high-resolution dye lasers for the resonance steps and a 100 watt cw Nd:YAG laser for photoionization. The use of cw lasers offers both better duty cycle and much better resolution than is possible with pulsed lasers. We have observed an isotopic selectivity of 800 between ^{137}Ba and ^{138}Ba in the cw resonance process. Ionization efficiency is estimated to be about 10^{-4} and simple improvements should improve this value to near unity.

48159 Separation of rare earth isotopes using resonance ionization time-of-flight mass spectrometry. Armstrong, D.P.; McCullar, W.H.; Schweitzer, G.K. (Oak Ridge Gaseous Diffusion Plant, TN). pp 119-125 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Stable isotopes comprise a very large portion of the periodic table. They find a wide variety of applications, which include serving as precursors for radioisotopes and radipharmaceuticals and as accelerated particle targets. Isotopes of the lanthanides, with very high boiling points and low natural abundances, are often difficult to separate by conventional electromagnetic techniques. Photoionization is a potential alternative method. We have devised a system in which an atomic beam of the rare earth metal is admitted to the ionization region of a time-of-flight mass spectrometer. Photoionization is achieved using a pulsed, two-photon laser scheme. Preliminary results from the photoionization of samarium are discussed.

48160 Americium and curium chemistry and technology. Edelstein, N.M.; Navratil, J.D.; Schultz, W.W. Hingham, MA; D. Reidel Publishing Co. (1985). 360p.

The work is on americium and curium chemistry and technology. This volume deals with the historical details of the discovery of elements 95 and 96 and the early elucidation of the basic inorganic chemistry of americium and curium. Proceeding from this basis, the book moves on to discuss current research directions, including topics such as solution chemistry, high pressure effects on solids, thermodynamics, etc.

48161 Pressure-induced torsional isomerism in $[n\text{-}Bu_4N]_2[Re_2X_8]$ (X = Br, I). Carroll, T.L.; Shapley, J.R.; Drickamer, H.G. (Univ. of Illinois, Urbana). *Journal of the American Chemical Society;* **107**: No. 20, 5802-5803(1985). Contract AC02-76ER01198.

The structural hallmark of the metal-metal quadruple bond, first characterized in $[Re_2Cl_8^{2-}]$, is an eclipsed conformation of the two ML_4 halves of the molecule, despite the resulting steric interactions. Twisted conformations, however, can be induced in certain cases by ligands bridging the two metal centers. The authors wish to report evidence that high pressure applied to salts of both $[Re_2I_8^{2-}]$ and $[Re_2Br_8^{2-}]$ causes torsion from an eclipsed to a staggered conformation.

48162 Synthesis and characterization of some reduced ternary and quaternary molybdenum oxide phases with strong metal-metal bonds. Lii, K.H. Ames, IA; Iowa State Univ. (1985). 330p. University Microfilms Order No. 86-04,489.Contract W-7405-ENG-82.

Thesis (Ph. D.).

In the course of the research on reduced ternary and quaternary molybdenum oxides, very interesting compounds with strong metal-metal bonds were discovered. Among these solid-state materials are found discrete cluster arrays and structures with extended metal-metal bonding. Further study in this system has revealed that many new structures exist in this new realm. The synthesis, structures, bonding, and properties of these new oxides are presented in this thesis.

48163 Reduction of transition metal complexes by tris(bipyridyl)ruthenium(1+) ion, chromium(II) ion, and the 10-hydroxy-1-methylethyl radical. Connolly, P. II. Ames, IA; Iowa State Univ. (1985). 153p. University Microfilms Order No. 86-04,455.Contract W-7405-ENG-82.

Thesis (Ph. D.).

The kinetics and mechanisms of the reactions of photochemically generated tris(bipyridyl)ruthenium(1+) ion with various metal complexes were studied. The rates of reduction of some Co(III) complexes were at, or near, the diffusion controlled limit. Several rare earth ions, Eu^{3+}, Yb^{3+}, and Sm^{3+} were also reacted with the ruthenium(1+) complex. Yb^{3+} was reduced; however, the reaction was just above the limits of detection. Sm^{3+} was not reduced, in accord with the thermodynamics of the reaction. The reductions of some Cr(III) complexes, including pentaaquo(organo)chromium(2+) ions and pentaaquo(pyridine)chromium(3+) ions, were also studied. The reduction of the organochromium(2+) complexes proceeded at a rate that was similar to the $Cr(H_2O)_6^{3+}$ ion. The homogeneous catalytic production of H_2 from reduced metal halide solutions (M^{2+} = Cr^{2+}, Eu^{2+}, V^{2+}) is presented. The catalyst is a cobalt(II) macrocyclic complex, $Co(dmgBF_2)_2$, which is reduced by the M^{2+} ions to form, ultimately, a hydridometal complex. This complex leads to the evolution of H_2 in the acidic solutions employed. The mechanism of the reaction is discussed in terms of the Michaelis-Menten scheme for enzyme catalysis. A photochemical method for the generation of 1-hydroxy-1-methylethyl radical for kinetic study is presented. This radical is reacted with $BrCo(dmgH)_2$ and $ClCo(dmgH)_2$ to produce the highly colored $Co(dmgH)_2$ complex, which serves as the indicator for the reaction.

48164 Synthesis and characterization of compounds containing discrete tetranuclear clusters and extended arrays of molybdenum atoms. Aufdembrink, B.A. Ames, IA; Iowa State Univ. (1985). 296p. University Microfilms Order No. 86-04,443.Contract W-7405-ENG-82.

Thesis (Ph. D.).

Improved synthetic pathways to the $Mo_4Cl_8L_4$ cluster compounds were elucidated which provide a facile entrance to the synthesis of new four metal atom clusters. The new tetranuclear clusters, with the stoichiometry $R_4Mo_4Cl_{12}$ (R = Et_4N, Pr_4N, O_4P), were prepared by the reaction of tealkylammonium or tetraphenylphosphonium chlorides with the rectangular tetrameric cluster $Mo_4Cl_8L_4$. One electron oxidation of $Mo_4Cl_{12}^{4-}$ by I_2 or dichlorophenyliodine yielded the $Mo_4Cl_{12}^{3-}$ cluster anion, which was shown to exist as two geometric isomers, both of which are fragments of the larger hexanuclear cluster anion $Mo_6Cl_{14}^{2-}$. The metal atoms in $(Et_4N)_3Mo_4Cl_{12}$ form an opened tetrahedron or butterfly. In $[O_4P]_3Mo_4Cl_{12}$, $[Pr_4N]_3$-Mo_4Cl_{12}, and $[O_4As]_2[Et_4N]Mo_4Cl_{12}$ the metal atoms form a planar rhomboidal cluster unit. Bond distances in both cluster units are indicative of strong metal-metal bonding. Magnetic susceptibility and electron paramagnetic resonance studies of $[O_4P]_3Mo_4Cl_{12}$ are consistent with the assignment of one unpaired electron, delocalized over the cluster unit. The ternary molybdenum oxide, Sn/sub 0.9/Mo_4O_8, was synthesized by high temperature reactions in sealed molybdenum tubes. The structure of this compound is dominated by metal-metal bonded octahedral clusters which are fused on trans edges to form infinite chains through the lattice. Four such clusters are interconnected to form a tetragonal tunnel occupied by Sn. Resistivity studies show the compound is metallic. The compound exhibits weak, temperature independent paramagnetism.

48165 Hybrid Patterson-superposition/direct-method approach to the x-ray phase problems, and in-lab EXAFS techniques. Lii, S.L.W. Ames, IA; Iowa State Univ. (1985). 242p. University Microfilms Order No. 86-04,490.Contract W-7405-ENG-82.

Thesis (Ph. D.).

Patterson manipulation methods and direct methods, such as those employing the well-known Σ_2 relation, are often viewed as being distinctly different approaches to structure determination. A method which combines the two approaches while retaining the advantages of both was developed. The basic assumption used in the method is that rho^2 ~ M/sub ps/.rho where rho and M/sub ps/ are the electron density and Patterson superposition functions, respectively. This results in a Σ_2-like relation in reciprocal space in which one of the E's in the product is replaced by G, a structure factor-like quantity obtained from a Fourier transform of the Patterson superposition function. This new relation has been proven to be effective in both centric and acentric cases. The details of the theory and its application to both model and real structures are presented. The construction and development of an in-lab EXAFS facility using a rotating anode X-ray source are presented. These include spectrometer alignment, automation, tests of the electronic detector systems, improvement of the energy resolution and development of both data acquisition and data reduction programs.

48166 Metal-oxygen systems. Altstetter, C.J. (Univ. of Illinois, Urbana-Champaign). *Bulletin of Alloy Phase Diagrams;* 5: No. 6, 543-553(1984). Contract AC02-76ER01198.

An overview of metal-oxygen systems with an emphasis on the metal-rich solid solutions is presented. Topics treated include: metal-oxygen equilibria, metals in high-temperature oxidizing environments, oxygen solubility, oxygen-solute interactions, free energies of solution of oxygen in liquid metals such as copper, solubility of metal oxides in the solid metals, phase diagrams of metal-oxygen systems, changes in properties, periodic behavior, enthalpies of formation and of solution of various systems, thermodynamic studies, oxygen diffusion studies, trapping and trapping energies, and study of defects.

48167 Oxidation mechanisms and catalytic properties of the actinides. Colmenares, C.A. (Lawrence Livermore National Lab., CA). 15: 257-264(1984).

The study of actinide-element oxidation has been an ongoing project at several of the National Laboratories in the US and some of the European research institutes. The author has been involved in this task at LLNL for approximately the last 15 years. During this time he has explored the oxidation kinetics and surface reactivity of thorium and uranium, and some of the catalytic properties of ThO_2. The work on the oxidation of thorium was published recently and a summary is included in this review. On the other hand, some of the kinetics and mechanisms of uranium oxidation are presented in this review for the first time. A complete review is included of the early stages of oxidation for both thorium and uranium. The author emphasizes those measurements taken with surface-sensitive and optical spectroscopies because they provide a good experimental basis for mechanistic interpretations of kinetic data. All pertinent data to January 1984 is included. 244 references, 36 figures, 28 tables.

48168 Charge transfer in rare earth-trichloride graphite intercalation compounds. Boolchand, P.; Lemon, G.; Bresser, W.J.; McDaniel, D.H.; Eklund, P.C.; Heinz, R.E.; Stumpp, E.; Nietfeld, G. (Univ. of Cincinnati, OH). 52: No. 7, 675-679(1984). Contract AS05-81ER10936;FG05-84ER45151.

Results are reported of ^{151}Eu Moessbauer and optical reflectivity measurements on intercalation compounds formed either by the reaction of graphite with $EuCl_3$, or with $EuCl_3$:$AlCl_3$ mixtures, in the presence of Cl_2. Results on graphite flakes and highly-oriented-pyrolytic graphite (HOPG) indicate the presence of a single narrow Moessbauer line characteristic of Eu^{3+}, which the authors identify with intercalated $EuCL_4$. No evidence for Eu^{2+} was found in the Moessbauer spectra. Since Eu^{3+} is the most easily reduced of the rare earth ions, it was concluded that no reduction of any rare earth trichlorides takes place under similar conditions of intercalation. The optical reflectance spectrum of the HOPG-$EuCl_3$-Cl_2 exhibits a sharp Drude edge at ~1.2 eV consistent with metallic conduction and a moderate charge transfer. These results taken collectively suggest that the enhanced metallic conductivity in rare earth chloride intercalation compounds is associated with charge transfer from the graphite to the co-intercalated Cl_2 forming Cl^- and is consistent with measured stoichiometries C/sub n/EuCl/sub 3 + δ/, where $\delta \approx 0.2$. 15 references, 3 figures, 1 table.

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REFER ALSO TO CITATION(S) 47163, 47166, 47184, 48007, 48133, 48163, 48164, 48165, 48198, 48199, 48205, 48209, 48666

48169 (INIS-BR—476, pp 41-44) Development work on carbon stripper foils made by cracking of ethylene. Ueta, N.; Engel, W.G.P. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

48170 (LA-UR—86-2181) Unusual bond paths in organolithium compounds. Bachrach, S.M.; Ritchie, J.P. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 9p. (CONF-8606165—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012441.

We have applied the topological method to a number of organolithium compounds. The wavefunctions were determined with GAUSSIAN-82 using 3-21G basis set and fully optimized geometries. Gradient paths were obtained using the RHODER package and critical points were located using EXTREME. These results indicate the unusual nature of organolithium compounds. The strange bond paths arise mainly from the ionic nature of the C-Li interaction. We suggest that the term "bond path" may best be suited for covalent bonds. 4 figs., 1 tab.

48171 (NP—6752564) Elementary reactions of electronically excited molecules. Pt. 6. Quenching of $O_2(^1\Delta sub(g))$ by amines, furanes, pyrroles and thiophenes. Hack, W.; Voehringer, C.; Wagner, H.G. (Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.)). Sep 1985. 61p. NTIS (US Sales Only), PC A04/MF A01. File Number DE86752564.

Max-Planck-Institut fuer Stroemungsforschung. Bericht.; No. 21.

The object of this report is the investigation of the reactions of $O_2(^1\Delta sub(g))$ with a large excess of 2,5 dimethylfuran, pyrroles, thiophenes and for comparison with trimethylamine in a flow system under pseudo first order conditions. Some arguments for the pressure dependence observed in many quenching reactions of $O_2(^1\Delta sub(g))$ are given and the quenching rate constants are compared with previously published values.

48172 Syntheses and structures of $[HB(pz)_3](CO)_2(CS)W$-$Au(PR_3)$. First examples of a semibridging CS ligand. Kim, H.P.; Kim, S.; Jacobson, R.A.; Angelici, R.J. (Iowa State Univ., Ames). *Journal of the American Chemical Society;* **108**: No. 17, 5154-5158(20 Aug 1986). Contract W-7405-ENG-82.

Reactions of $[HB(pz)_3](CO)_2W(CS)^-$ with $ClAuPR_3$ (R = Ph or Me) yield the complexes $[HB(pz)_3](CO)_2$-(CS)W-$Au(PR_3)$, which have a semibridging CO and a semibridging CS, the first examples of CS in this bonding mode. X-ray diffraction studies of the complexes show the semibridging CO and CS ligands to be bent: W-C-O (173.4 (7)°) and W-C-S (165.9 (5)°); data are for the PPh_3 complex. The much shorter Au-CS (2.162 (7) A) than Au-CO (2.720 (8) A) bond distance indicates a substantially stronger semibridging interaction for CS than CO with the Au. The Au-CO distance is 0.174 A shorter in the PMe_3 than in the PPh_3 derivative. This result, together with the short Au-CS bond distance, suggests the primary interaction between the semibridging CO and CS groups with Au is a donation of electron density from the Au to the CO and CS π^* orbitals. The J/sub PC/ coupling constant (7.39 Hz) for the semibridging CO in the PMe_3 compound is larger than that in the PPh_3 compound (J/sub PC/ congruent to 0 Hz), and the J/sub PC/ coupling constant in the PPh_3 compound is much greater for the semibridging CS (34.18 Hz) than for the semibridging CO (~ 0 Hz).

48173 Hydrido methylidene, hydrido vinylidene, hydrido oxo, and hydrido formaldehyde derivatives of bis(pentamethylcyclopentadienyl)tantalum. van Asselt, A.; Burger, B.J.; Gibson, V.C.; Bercaw, J.E. (California Institute of Technology, Pasadena). *Journal of the American Chemical Society;* **108**: No. 17, 5347-5349(20 Aug 1986). Contract FG03-85ER13431.

Transition-metal complexes of the general class L/sub n/ M(H)(=X) (X = CH_2; C = CH_2, O) are of interest as models for reactive intermediates in a variety of catalytic processes. Hydrido alkylidene complexes, generated by a 1,2-hydrogen shift from metal alkyls, have been postulated to play an important role in the metathesis and polymerization of olefins, while surface-bound vinylidene species have been detected and recently proposed to account for linear/branched hydrocarbon distributions in Fischer-Tropsch synthesis. The third member of the class described here, L/sub n/ M(H)(=O), is of fundamental importance in reactions involving H_2O, O_2, or peroxides. Although an example of an oxo hydride has not previously been reported, several oxo alkyl species have been characterized recently. The authors have described the preparation of a number of permethyltantalocene derivatives and commented on the remarkable stability conferred by two pentamethylcyclopentadienyl ligands. This important facet and a general reluctance for permethyl-metallocene derivatives to undergo oligomerization processes have allowed us to prepare and investigate the reaction chemistry of a number of monomeric hydrido derivatives of general formula Cp^*_2 Ta(H)(=X) [Cp^* = eta^5-C_5Me_5; X = CH_2 (1), C = CH_2. We have also isolated an eta^2-formaldehyde adduct $CP^*_2Ta(H)(eta^2$-$CH_2O)$. Such species continue to attract interest as models for possible intermediates in CO hydrogenation, and they describe herein a novel C-O bond cleavage reaction at elevated temperatures to afford the oxo alkyl derivative, Cp^*_2 $Ta(CH_2)(=O)$.

48174 Facile cyclization of the valeronitrile group bound to a nickel macrocycle. Bakac, A.; Espenson, J.H. (Iowa State Univ., Ames). *Journal of the American Chemical Society;* **108**: No. 17, 5353-5354(20 Aug 1986). Contract W-7405-ENG-82.

The reduction of $Br(CH_2)_4CN$ in alkaline, aqueous solution by the nickel(I) macrocycle (R,R,S,S)-Ni(tmc)$^+$ yields the acyclic organonickel complex $NC(CH_2)_3CH_2Ni(tmc)^+$ (λ/sub max/ 394 nm, epsilon 2.0 x 10^3 M^{-1} cm^{-1}). When 0.5-1 M H_3O^+ is added immediately to the freshly prepared complex, it rapidly hydrolyzes to the acyclic product $CH_3(CH_2)_3CN$. If, on the other hand, the acyclic organonickel complex is allowed to stand in solution at pH 2-12, then cyclopentanone is the only organic product formed in ~ 100% yield. The values of the rate constants at 25°C and activation parameters for the cyclizations of $NC(CH_2)_3CH_2Ni(tmc)^+$ (k/sub c/ = 0.135 s^{-1}, Δ H double dager = 19.8 +/- 0.3 kcal mol^{-1}, Δ S = 4.0 +/- 1.0 cal mol^{-1} K^{-1}) and the free radical[36] (k/sub c/ = 3.9 x 10^3 s^{-1}, Δ Hdouble dager = 8.0 kcal mol^{-1}, Δ S double dager = -15.2 cal mol^{-1} K^{-1}) definitely show that these are two different processes. Indeed, the cyclizing entity in the nickel complex is probably best considered a nickel-bound carbanion. The main contributions to the activation enthalpy come from cyclization and the breaking of the Ni-C bond. The relatively high Δ S double dager seems to indicate that cyclization occurs in concert with hydrolysis, eq 3, and not as an entirely intramolecular process with the transient formation of $(CH_2)_4CNNi(tmc)^+$.

48175 Conversion of the μketene ligand in $[PPN][Os_3(CO)_{10}(\mu$-I)$(\mu$-$CH_2CO)]$ into enolate, acyl, and vinyl ligands. Bassner, S.L.; Morrison, E.D.; Geoffroy, G.L.; Rheingold, A.L. (Pennsylvania State Univ., University Park). *Journal of the American Chemical Society;* **108**: No. 17, 5358-5359(20 Aug 1986).

Free ketene is a valuable organic synthetic reagent, but its utility is somewhat limited by its high reactivity and tendency to dimerize to yield diketene. The ketene ligand is obviously stabilized by metal coordination in a variety of bonding modes, but it is not yet known how coordination influences the chemistry of this important molecule. The authors have studied the reactivity of the coordinated ketene ligand of type II found in the anionic cluster compound $[PPN][Os_3(CO)_{10}(\mu$-I)$(\mu$-$CH_2CO)]$ (1) (PPN^+ = $(Ph_3P)_2N^+$) and herein show that this ligand is readily converted into eta-enolate ligands upon reaction with simple nucleophiles and into vinyl and acetyl ligands upon reaction with electrophiles.

48176 Resonance Raman, electron spin resonance, and molecular orbital studies of m-benzosemiquinone radical anion. Tripathi, G.N.R.; Chipman, D.M.; Miderski, C.A.; Davis, H.F.; Fessenden, R.W.; Schuler, R.H. (Univ. of Notre Dame, IN). *Journal of Physical Chemistry;* **90**: No. 17, 3968-3975(14 Aug 1986).

The resonance Raman spectrum of m-benzosemiquinone radical anion, examined by pulse radiolysis methods, shows this radical to have a CO stretching frequency of 1519 cm^{-1} that is similar to that of phenoxyl radicals and only 4 cm^{-1} lower than that for 3-hydroxyphenoxyl radical. A strong Raman band at 1093 cm^{-1} is assigned to a second CO stretching frequency. Theoretical molecular orbital studies suggest that the lowest electronic state is one of C/ sub s/ symmetry, with one CO bond 0.04 A longer than the other. These findings are in accord with the relatively high reactivity of

this radical, which indicates that it has substantial phenoxyl-like character, in contrast to the unreactive nature of its para isomer, which is strongly stabilized by resonance, making the CO bonds equivalent. The ESR spectrum indicates either that the radical has C/sub 2nu/ symmetry or that there is rapid exchange of unpaired spin between the two oxygen atoms in a structure of lower symmetry.

48177 Substituent effects on rates of one-electron oxidation of phenols by the radicals ClO_2, NO_2, and SO_3^-. Alfassi, Z.B.; Huie, R.E.; Neta, P. (National Bureau of Standards, Gaithersburg, MD). *Journal of Physical Chemistry;* **90**: No. 17, 4156-4158(14 Aug 1986).

Rate constants for the reactions of ClO_2, NO_2, and SO_3^- radicals with several substituted phenoxide ions have been measured by pulse radiolysis. They vary from the immeasurably slow ($<10^4$) to almost diffusion-controlled rates ($>10^9$ $M^{-1}s^{-1}$) and depend on the redox potentials of the phenoxide ions and the inorganic radicals. With the weak oxidant SO_3^- reverse reactions were observed in certain cases; i.e., the phenoxyl radical oxidizes sulfite ions. An attempt is made to correlate the rate constants with Hammett's substituent constants and the results are compared with those obtained previously for the reactions of various inorganic radicals with phenols and phenoxide ions.

48178 NMR study of solid naphthalene solubilities in supercritical carbon dioxide near the upper critical end point. Lamb, D.M.; Barbara, T.M.; Jonas, J. (Univ. of Illinois, Urbana). *Journal of Physical Chemistry;* **90**: No. 17, 4210-4215(14 Aug 1986). Contract FG22-82PC50800.

Solid solubilities of naphthalene in supercritical carbon dioxide have been measured near the upper critical end point of the binary mixture by using a novel, in situ NMR technique. Solubility data were obtained at 50.0, 55.0, and 58.5°C over a pressure range of 120-500 bar. The pressure-temperature trade of the solid-liquid-gas phase line that terminates at the upper critical end point was also determined. The solubility results are discussed in terms of the supercritical solubility theory of Gitterman and Procaccia. This approximative analysis gives the location of the upper critical end point as T/sub c/ = 60.1°C and P/sub c/ = 226 bar.

48179 Isotope effects in arene C-H bond activation by $[(C_5Me_5)Rh(PMe_3)]$. Jones, W.D.; Feher, F.J. (Univ. of Rochester, NY). *Journal of the American Chemical Society;* **108**: No. 16, 4818-4819(6 Aug 1986). Contract AC02-83ER13095.

The isotope effects involved in the activation of arene C-H bonds by the intermediate $[(C_5Me_5)Rh(PMe_3)]$ have been investigated. The ratio k/sub H/k/sub D/ for coordination to a double bond in benzene (the rate-determining step of arene activation) is found to be 1.05 (6), whereas k/sub H//k/sub D/ = 1.4 for the second step in which the C-H bond of the coordinated arene undergoes oxidative addition. The isotope effect K/sub H/D/ for the equilibrium between the more stable phenyl hydride complex $(C_5Me_5)Rh(PMe_3)(C_6D_5)H$ and the complex containing hydrogen in the ortho position of the phenyl ring $(C_5Me_5)Rh(PMe_3)(o\text{-}C_6D_4H)D$ shows a preference for hydrogen (vs. deuterium) on the metal of 2.7. The kinetic isotope effect for reductive elimination and dissociation of m-xylene from $(C_5Me_5)Rh(PMe_3)(3,5\text{-}C_6H_3Me_2)H$ vs. $(C_5Me_5)Rh(PMe_3)(3,5\text{-}C_6H_3Me_2)D$ is found to be inverse, with k/sub H//k/sub D/ = 0.51. Analysis of the data for the deuterated benzene derivatives confirms that the kinetic isotope for the reductive elimination step is inverse. Attempts to prepare the complex $(C_5Me_5)Rh(PMe_3)(CH_3)D$ by reduction of $[(C_5Me_5)Rh(PMe_3)(CH_3)(THF)]^+$ with $[DBEt_3]^-$ resulted in the formation of both $(C_5Me_5)Rh(PMe_3)(CH_3)D$ and $(C_5Me_5)Rh(PMe_3)(CH_3D)H$.

48180 Inter- and intramolecular insertion of rhenium into carbon-hydrogen bonds. Wenzel, T.T.; Bergman, R.G. (Univ. of California, Berkeley, CA). *Journal of the American Chemical Society;* **108**: No. 16, 4856-4867(6 Aug 1986). Contract AC03-76SF00098.

$CpRe(PMe_3)_2$ (1) was synthesized in 38% yield by Na/Hg reduction of $ReCl_3(PMe_3)_2$ (3) with cyclopentadiene. UV irradiation of 1 in benzene and cyclopropane liberated PMe_3 and gave in respective C-H insertion products $Cp\text{-}(PMe_3)_2Re(Ph)H$ (4, 64%) and $Cp(PMe_3)_2Re(c\text{-}C_5H_5)H$ (5, 38%). Irradiation of 1 in n-hexane or cyclopentane provided $Cp(PMe_3)_2Re(n\text{-}C_6H_{13})H$ (8, 15%) and $Cp(PMe_3)_2Re(c\text{-}C_5H_9)H$ (9, 17%) but only at less than -30°. Irradiation of 1 at 5-10°C in cyclohexane afforded cyclometalated product $Cp(PMe_3)Re(eta^2\text{-}CH_2PMe_2)H$ (10, 31%) and $Cp(PMe_3)_2Re(eta^1\text{-}CH_2PMe_2)H$ (11, 14%). 10 can dimerize to 16 and 17. The structure of 16 was determined by X-ray crystallography. Irradiation of 1, or thermolysis (20°C) of 10 in cyclohexane with methane gave $Cp(PMe_3)_2Re(Me)H$ (12, 43%). Irradiation of 1 with ethylene in cyclohexane gave $Cp(PMe_3)_2Re(CH{=}CH_2)H$ (14), which isomerized quantitatively to $Cp\text{-}(PMe_3)_2Re(eta^2\text{-}(CH_2{=}CH_2))$ (15, 45%) at 20°C in benzene. Irradiation of 15 regenerated 14, regardless of solvent. Thermolysis (20°C) of 8 with ethylene gave almost exclusively 14, thus ruling out 15 as the intermediate in the formation of 14. Isolation of compounds, 1, 5, 8, 10, 12, 15, and 16 in pure form required air-free chromatography at ca. -110°C. An efficient synthesis of $Cp(PMe_3)_2ReH_3$ (6, 71% from 3) is reported. Deprotonation of 6 followed by methylation afforded 12 (72%). All of the alkane C-H insertion products undergo facile reductive elimination of RH at room temperature.

48181 Thermochemical comparisons of homogeneous and heterogeneous acids and bases. 1. Sulfonic acid solutions and resins as prototype Broensted acids. Arnett, E.M.; Haaksma, R.A.; Chawla, B.; Healy, M.H. (Duke Univ., Durham, NC). *Journal of the American Chemical Society;* **108**: No. 16, 4888-4896(6 Aug 1986). Contract FG22-82PC50807.

Heats of ionization by thermometric titration for a series of bases (or acids) can be used to compare solid acids (or bases) with liquid analogues bearing the same functionalities in homogeneous solutions. The method is demonstrated for Broensted acids by reacting a series of substituted nitrogen bases with solutions of p-toluenesulfonic acid (PTSA) in acetonitrile and with suspensions of the microporous polymeric arylsulfonic acid resin-Dowex 50W-X8 in the same solvent. Under well-controlled anhydrous conditions there is a good correlation ($r = 0.992$) between the heats of reaction of the bases with the homogeneous and heterogeneous acid systems, but the homogeneous system gives a more exothermic interaction by 3-4 kcal mol^{-1} for a series of 29 substituted pyrimidines, anilines, and some other amines. This difference may be attributed to homohydrogen bonding interactions between excess acid and sulfonate anion sites which are more restricted geometrically in the resin than in solution. Other factors which affect the enthalpy change for the acid-base interaction are the acid/base ratio, the water content of the sulfonic acid, the solvent, and the resin structure (e.g., microporous vs. macroporous). Steric hindrance in the base does not differentiate solid from homogeneous acid. In addition to the use of titration calorimetry, heats of immersion are reported for the Dowex-arylsulfonic acid resins and the Nafion-perfluorinated sulfonic acid resin in a series of basic liquids. The results are compared with each other and with those from a previous study of several varieties of coal.

48182 Preparation and characterization of radical cation salts derived from perfluorobenzene, perfluorotoluene, and perfluorophthalene. Richardson, T.J.; Tanzella, F.L.; Bartlett, N. (Univ. of California, Berkeley). *Journal of the American Chemical Society;* **108**: No. 16, 4937-4943(6 Aug 1986). Contract AC03-76SF00098.

The salts $C_6F_6^+AsF_6^-$, $C_6F_5CF_3^+AsF_6^-$, and $C_{10}F_8^+AsF_6^-$ may be prepared by electron oxidation of the appropriate perfluoro aromatic molecule with $O_2^+AsF_6^-$. Other O_2^+ salts can be similarly employed as can the more strongly oxidizing transition-metal hexafluorides, but salts of the latter are more labile than their AsF_6^- relatives. $C_6F_6^+AsF_6^-$ is a convenient electron oxidizer since that which remains from the reaction decomposes at room temperature to volatile products. Magnetic susceptibilities for $C_6F_6AsF_6$ and $C_{10}F_8AsF_6$ approximate to Curie law behavior, and g values are close to free-electron values. X-ray diffraction data (single crystal) show $C_6F_6AsF_6$ to be primitive rhombohedral with $a_0 = 6.60$ (1) A, $\alpha = 106.0$ (1)°, V = 246.1 A^3, Z = 1, probable space group R-3, and (powder data) $C_{10}F_8AsF_6$ to be tetragonal with $a_0 = 8.27$ (5) A, $c_0 = 18.57$ (s) A V = 1270 A, Z = 4. Salts derived from the monocyclic perfluoro aromatics are thermally unstable but can be kept below -15 °C. The perfluoronaphthalene salts are indefinitely stable at room temperatures. All hydrolyze rapidly. The products

of thermal decomposition of the hexafluoroarsenates of the monocyclic cation salts parallel the products of the attack by F^-. The latter reaction products are in the molar ratios indicated by the following equations: $2C_6F_6^+ + 2F^- \rightarrow C_6F_6 + 1,4\text{-}C_6F_8$; $2C_6F_5CF_3^+ + 2F^- \rightarrow C_6F_5CF_3 + 1,3\text{-}C_6F{\rightarrow}CF_3$. The $1,3\text{-}C_6F{\rightarrow}CF_3$ isomerizes to a 1:1 mixture with $1,4\text{-}C_6F_7CF_3$.

48183 Methyl isocyanide isomerization kinetics: determination of collisional deactivation parameters following C-H overtone excitation. Snavely, D.L.; Zare, R.N.; Miller, J.A.; Chandler, D.W. (Stanford Univ., CA). *Journal of Physical Chemistry;* **90**: No. 16, 3544-3549(31 Jul 1986).

The isomerization of methyl isocyanide (CH_3NC) to acetonitrile (CH_3CN) was studied by excitation of the 5nu/sub C-H/ (726.6 nm) and 6nu/sub C-H/ (621.4 nm) overtone states, which lie about 1 and 8 kcal/mol, respectively, above the isomerization barrier. Products yields were measured as a function of pressure and collision partner. A Stern-Volmer plot (yield^{-1} vs. pressure) shows that (1) deactivation by collision with pure CH_3NC is more rapid than with C_6H_6, SF_6, or Ar, (2) the collisional deactivation efficiencies decrease in going from C_6H_6 to SF_6 to Ar, and (3) the single-collision deactivation approximation (strong collider approximation) fails for both the 6nu/sub C-H/ and 5nu/sub C-H/ data. With the use of a master equation solution, assuming an exponential down energy-transfer function, the average energy transferred in a deactivating collision, -<ΔE>/sub down/, is extracted from each data set, as well as the average energy transferred fer collision, -<ΔE>. It is concluded that the isomerization yield depends markedly on the collision partner and on the average energy transferred per collision, -<ΔE>, even though the single-collision deactivation approximation might have been expected to have its greatest validity in this energy regime.

48184 Solvent reorganization in optical and thermal electron-transfer processes. Brunschwig, B.S.; Ehrenson, S.; Sutin, N. (Brookhaven National Lab., Upton, NY). *Journal of Physical Chemistry;* **90**: No. 16, 3657-3668(31 Jul 1986). Contract AC02-76CH00016.

Dielectric continuum models used to calculate the solvent reorganization energy in thermal and photochemical electron-transfer reactions are discussed. Expressions are derived for the reorganization energy for charge redistribution within a single ellipsoidal or spherical solvent cavity. The expressions for the ellipsoidal cavity model differ in important respects from those derived previously. The Marcus two-sphere and the ellipsoidal cavity model differ in important respects from those derived previously. The Marcus two-sphere and the ellipsoidal cavity models can satisfactorily predict the band maximum for the metal-to metal charge-transfer transition in a number of ion-paired and bridged binuclear systems, provided careful consideration is given to the cavity dimensions. In complexes containing 2,2'-bipyridine ligands the solvent can approach close to the charge centers by filling the space between the ligands: this results in a small effective radius and relatively large values for the solvent reorganization energy. On the other hand, in complexes containing ammine ligands the effective radius is increased due to the effects of dielectric saturation resulting from specific ligand interactions with the solvent. Despite the limitations of the two-sphere model the reorganization energies calculated are, in general, not very different from those obtained with the ellipsoidal cavity model.

48185 Distance, stereoelectronic effects, and the Marcus inverted region in intramolecular electron transfer in organic radical anions. Closs, G.L.; Calcaterra, L.T.; Green, N.J.; Penfield, K.W.; Miller, J.R. (Univ. of Chicago, IL). *Journal of Physical Chemistry;* **90**: No. 16, 3673-3683(31 Jul 1986). Contract W-31-109-ENG-38.

A series of molecules with the general structure A_1-Sp-A_2 have been synthesized. Pulse radiolysis was used to convert them into negative ions, and the rates of intramolecular electron transfer were measured. In the first series studied Sp is the androstane skeleton with the acceptors attached to the 3- and 16-positions. The series consisted of eight molecules with A_2 = 4-biphenyl and eight different A_1 groups differing in electron affinity by 2.4 eV. The electron transfer rates differ by more than 3 orders of magnitude throughout the series and depend in a very nonlinear fashion on the free energy of the reaction. The second series of molecules was designed to study the effect of the spacer which was varied from the steroid to decalins (eight compounds) and cyclohexanes (four compounds). No comprehensive distance dependence exists. Instead, the rates are strongly influenced by the donor-acceptor attachment geometry which influences the electronic coupling. For the type of spacers studied it was found that the electron transfer rates are slowed down by 1 order of magnitude for each 2.0 bonds for a constant reorganization energy.

48186 Kinetic studies on the reaction center protein from Rhodopseudomonas sphaeroides: the temperature and free energy dependence of electron transfer between various quinones in the Q/sub A/ site and the oxidized bacteriochlorophyll dimer. Gunner, M.R.; Robertson, D.E.; Dutton, P.L. (Univ. of Pennsylvania, Philadelphia). *Journal of Physical Chemistry;* **90**: No. 16, 3783-3795(31 Jul 1986). Contract AC02-80ER10590.

The temperature and free energy dependence of electron transfer from the primary semiquinone (Q/sub A/sup .-/) to the oxidized bacteriochlorophyll dimer [$(BChl)_2$/sup .+/ have been measured in the reaction center protein from Rhodopseudomonas sphaeroides in which the native Q/sub A/, ubiquinone-10, has been removed and replaced by one of 11 substituted 9,10-anthraquinones, seven 1,4-naphthoquinones, 1,2-naphthoquinone, or five 1,4-benzoquinones. For 19 of these quinones an in situ midpoint potential value at 295 K for the Q/sub A//Q/sub A//sup .-/ couple was available providing a series of reaction center proteins with a variation of reaction $-\Delta G^\circ$ from 0.49 to 0.81 eV. The E/sub 1/2/ values for the remaining Q/sub As/ were estimated from measurements on quinones in solution, extending the reaction $-\Delta G^\circ$ range from 0.11 to 0.94 eV. The rates of intraprotein electron transfer from the various Q/sub A//sup .-/ molecules to $(BChl)_2$/sup .+/ were found to be virtually independent of temperature from 5 to 100 K and, where measured, to decrease severalfold from 100 to 300k, a pattern well-known for native reaction center protein. Preliminary attempts have been made to model the observed dependence of the electron-transfer rate on the $-\Delta G^\circ$ and temperature in terms of current theories that describe electron-transfer reactions as nonadiabatic, multiphonon, nonradiative decay processes.

48187 [4 + 4] dimerization of 2,3-dimethylene-2,3-dihydrofuran: secondary deuterium kinetic isotope effect evidence of a two-step mechanism. Chou, C.H.; Trahanovsky, W.S. (Iowa State Univ., Ames). *Journal of the American Chemical Society;* **108**: No. 14, 4138-4144(9 Jul 1986). Contract W-7405-ENG-82.

2,3-Dimethylene-2,3-dihydrofuran (1a), prepared by the flash vacuum pyrolysis of 2-methyl-3-furylmethyl benzoate (2a), rapidly dimerizes to form almost exclusively the [4 + 4] head-to-head dimer 3a. Rate constants k/sub a/, k/sub b/, k/sub c/, and k/sub d/ were measured at several temperatures for the dimerization, a [4 + 4] cycloaddition, of 1a, 2-methylene-3-dideuteriomethylene-2,3-dihydrofuran (1b), 2-dideuteriomethylene-3-methylene-2,3-dihydrofuran (1c), and 2-3-bis(dideuteriomethylene)-2,3-dihydrofuran (1d), respectively. At -30.0°C these rate constants in L $mol^{-1}s^{-1}$ were found to be k/sub /a = 6.223 +/- 0.458 x 10^{-4}, k/sub b/ = 1.147 +- 0.087 x 10^{-3}, k/sub c/ = 6.750 +- 0.602 x 10^{-4}, and k/sub d/ = 1.169 +- 0.086 x 10^{-3}, which indicates that k/sub a/ ~ k/sub c/ and k/sub b//k/sub a/ ≈ k/sub d//k/sub a/ = 1.86. It was found that the [4 + 4] dimerization rate of 1a is virtually the same in solvents ranging from 5:1 to 1:5 $CS_2/CDCl_3$, a result not consistent with the involvement of a zwitterionic intermediate. The secondary deuterium kinetic isotope effect results and the insignificant solvent effects lead to the conclusion that the [4 + 4] dimerization of 1a proceeds via a stepwise mechanism involving a diradical intermediate. The activation enthalpy, ΔH/sup double dagger/, for the 9 dimerization of 1a at 25°C is 10.2 +/- 0.3 kcal mol^{-1} and the activation entropy, ΔS/sup double dagger/, is -30.9 +/- 1.2 entropy units.

48188 Reactivity of rhodium and iridium octaethylporphyrin hydrides toward carbon monoxide; thermodynamic studies of the rhodium formyl and iridium hydrido carbonyl complexes. Farnos, M.D.; Woods, B.A.; Wayland, B.B. (Univ. of Pennsylvania, Philadelphia). *Journal of the American Chemical Society;* **108**: No. 13, 3659-3663(25 Jun 1986).

Iridium octaethylporphyrin hydride, Ir(OEP)(H), reacts with carbon monoxide to form the carbonyl complex Ir(OEP)(H)(CO) at the same conditions where Rh(OEP)(H) reacts with CO to produce the metalloformyl complex Rh-(OEP)(CHO). Thermodynamic studies for these reactions are reported and discussed in terms of differences in the M-H and M-C bond energies and the acceptor properties of the five-coordinate metalloporphyrin hydride complexes.

48189 Theoretical studies on the reaction of atomic oxygen ($O(^3P)$) with acetylene. Part 2. Harding, L.B.; Wagner, A.F. (Argonne National Lab., IL). *Journal of Physical Chemistry;* **90**: No. 13, 2974-2987(19 Jun 1986). Contract W-31-109-ENG-38.

Ab initio electronic structure calculations have been used to characterize the equilibrium and saddle points for the addition of $O(^3P)$ to HCCH on the two lowest triplet surfaces. Structures, frequencies, and energetics are presented and, when possible, directly compared to those from experiment. The saddle point for abstraction of H from HCCH by $O(^3P)$ has also been characterized for the two lowest triplet surfaces by analogy with recent ab initio calculations on similar abstraction reactions. Systematic errors in the calculated energetics are corrected by semiempirical arguments. Comparisons of the energetics are also made to semiempirical BAC-MP4 calculations. The final characterizations of the stationary points on the addition and abstraction surfaces are then used in RRKM calculations of the rate constants and product branching ratios. These calculations are compared to experiment. The comparisons show (1) abstraction is not an important process, (2) theory and experiment are in good agreement for the overall rate of reaction at temperatures below 1000 K but predict substantially lower rates than observed in high-temperature shock tube experiments, (3) the calculated branching ratio, production of H + HCCO over the total rate of reaction, is not small (certainly over 25% and most likely over 50%) with a relatively weak temperature dependence and no pressure dependence, and (4) the ground-state triplet surface ($^3A'$) dominates both the overall rate constant and the branching ratio with the excited triplet surface ($^3A'$) introducing only minor perturbations.

48190 Analytical conditions and data for cyclodextrin induced solid-surface room-temperature luminescence of selected compounds. Bello, J.M.; Hurtubise, R.J. (Univ. of Wyoming, Laramie). *Analytical Letters;* **19**: No. 7-8, 775-796(1986). Contract AC02-80ER10624.

α-Cyclodextrin-NaCl mixtures studied as solid-surface substrates for inducing room-temperature phosphorescence (RTP) and fluorescence (RTF). The optimum conditions for inducing room-temperature luminescence were investigated extensively for four model compounds. Experimental conditions such as solvent, drying temperature, and surface atmosphere of the sample had a significant effect on luminescence signals. Furthermore, the analytical aspects of cyclodextrin induced solid-surface room-temperature luminescence (CISS-RTL) such as spectral characteristics, linear dynamic range, reproducibility of signal, and limits of detection were obtained. This is the first report of analytical figures of merit for the solid-surface luminescence of organic compounds mixed with α-cyclodextrin-NaCl.

48191 Use of a graph theoretic similarity index in prediction studies of linear discriminants and models. Jaeger, E.P.; Jurs, P.C. (Pennsylvania State Univ., University Park). pp 275-283 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A goal of many structure-activity and structure-property studies is to develop the capability to predict the activity or property of interest for previously untested compounds. A quantitative model or a discriminant is developed from a training set of molecules with known activities or properties. The best test of the predictive ability of a model or a discriminant is to predict the activities or properties of a set of unknown compounds, so the agreement between predicted and observed values can be judged. Unknown compounds which are structurally similar to those of the training set stand the best chance of being predicted accurately. Structural similarity can be assessed with atom pairs. The metric is based on the relative frequencies of all unique atom pairs in each compound being compared. The method can be used to compare two molecules, or it can be used to characterize a set of compounds, or it can be used to compare a few compounds (a prediction set) to a large collection of compounds (a training set). The characteristics of the atom pair similarity measure are discussed and examples of its use in the selection of prediction set members in several structure-activity and structure-property studies are shown.

48192 Vibronic activity probed by laser jet spectroscopy. Warren, J.A. Ames, IA; Iowa State Univ. (1985). 145p. University Microfilms Order No. 86-04,528.Contract W-7405-ENG-82.

Thesis (Ph. D.).

Laser jet spectroscopy is applied to study the vibronic activity in β-methylnaphthalene and phenanthrene. Results of these studies indicate that the technique is invaluable in the determination of the mechanisms and spectral manifestations of vibronic coupling in large polyatomic species. In the S_1 state of β-methylnaphthalene, a Duschinsky rotation of normal coordinates results in extensive mode mixing as evidenced by highly structured single vibronic level (SVL) fluorescence spectra and drastic absorption/fluorescence mirror symmetry breakdown (MSB). The rotation is shown to be well modeled by simple first order perturbation formulae which readily reproduce the observed spectra. Additionally, anharmonicities to fourth order are apparent from the spectra of the molecule. In phenanthrene, absorption/fluorescence MSB is shown to be primarily the result of Condon/Herzberg-Teller transition moment interferences and model calculations again indicate that simple first order formulae can be used to reduce the observed spectra. While mode mixing does not appear to be important for totally symmetric modes of the molecule, vibronically induced transition of b_2 symmetry clearly indicate mixing from a Duschinsky rotation in these normal modes. Mixing as a result of Fermi resonances is also observed for some levels.

48193 Chemistry of berkelium. Peterson, J.R.; Hobart, D.E. (Univ. of Tennessee, Knoxville). *Advances in Inorganic Chemistry and Radiochemistry;* **28**: 29-72(1984). Contract AS05-76ER04447;W-7405-ENG-26;W-7405-ENG-36.

The possibility of studying the physical and chemical properties of Bk(II) in bulk is intriguing. It has been suggested that this new oxidation state of berkelium is produced by nature via the α decay of einsteinium-253 dihalides; however, in these absorption spectrophotometric studies, only the divalent parent species and the divalent californium-249 granddaughter species have been directly identified. Other work has shown that the β decay of berkelium-249 in the bulk-phase solid state results in the production of daughter californium-249 species exhibiting the same oxidation state and structural environment as those of the berkelium parent. Direct synthesis of Bk(II) via the reaction $Bk + 2BkBr_3 \rightarrow 3BkBr_2$ should be attempted to establish with certainty the existence of Bk(II) in the bulk-phase solid state and to characterize it via absorption spectrophotometry and X-ray powder diffraction. Studies of berkelium metal under pressure should be continued to determine more precisely its bulk modulus and to search for the existence of a distorted face-centered cubic (fcc) modification between the known fcc and α-uranium-type orthorhombic phases. An interesting extension of this research would be to investigate the behavior of BkN under pressure to see if it might undergo a sudden volume collapse corresponding to a change in metallic valence from three to four. The preparation and characterization of intermetallic compounds and alloys of berkelium should be pursued, as well as the determination of the stability constants of Bk(IV) complexes. The range of oxidation states accessible to berkelium might be expanded by stabilizing Bk(II) and/or Bk(V) in highly complexing aqueous, nonaqueous, or even molten salt media and/or in appropriate solid-state matrices. 240 references, 9 figures, 5 tables.

48194 **Highly stabilized radicals: benzylic radicals in polycyclic aromatic systems.** McMillen, D.F.; Trevor, P.L.; Golden, D.M. (SRI International, Menlo Park, CA). *Journal of the American Chemical Society;* **102**: No. 24, 7400-7402(1980). Contract AC03-79ER10483.

Rates and equilibria of gas-phase benzylic bond scission for ethylbenzene, 1-ethylnaphthalene, and 9-ethylanthracene were measured. Enthalpies of formation of the highly stabilized arylmethyl radicals produced were determined, and the extent to which these values validate a recently developed technique for estimating resonance stabilization energies in polycyclic aromatic hydrocarbon radicals was evaluated. The very low-pressure pyrolysis (VLPP) technique was used. In this technique the reactor pressure is maintained low enough that reactive fragments formed in the initial bond-breaking step escape from the reactor to the mass spectrometric detection system before they undergo enough gas-gas collisions to result in secondary reactions of the starting material.

48195 **(ORNL/tr—86/28) Condensation products of methyl chloro silane with dioxy-benzenes.** Jacovic, M. Translated from **288**: 324-332(1956). Contract AC05-84OR21400. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013997.

We wished to investigate the entire series of possibilities that the combination of individual methyl chloro silanes with individual dioxy benzenes offers. The influence of the functional stage of the methyl chloro silanes, as well as the position of the OH groups in the nucleus, seemed to us to be of primary interest. The studies on the reactions between trimethyl chloro silane, dimethyl dichloro silane and methyl trichloro silane with pyrocatechin, resorcinol and hydroquinone were undertaken from this standpoint. Molecular weight determinations were also carried out on the said, previously produced, simply structured molecules. These studies revealed that in the case of the reaction between the monofunctional methyl chloro silane with any dioxy benzene and in the reaction between the difunctional methyl chloro silane with o-dioxy benzene relatively simply structured molecules are formed, but that the other cases complex molecules arise. 3 refs., 1 tab.

4004 Electrochemistry

48196 **Pressure dependence of the dielectric strength of SO_2 and n-C_4F_{10}.** Nakanishi, K.; James, D.R.; Rodrigo, H.; Christophorou, L.G. (Oak Ridge National Lab., TN). *Journal of Physics, D (London). Applied Physics;* **17**: L73-L76(1984). Contract W-7405-ENG-26.

The dielectric strengths of sulphur dioxide (SO_2) and n-perfluorobutane (n-C_4F_{10}) have been investigated under DC voltages in uniform field geometries. The pressure range studied is between 3 and 265 kPa. The results show that the dielectric strength of both gases increases with the gas pressure, particularly in the pressure range below 100 kPa, even after allowing for the compressibility of the gases. An explanation of the phenomenon is discussed with reference to the pressure dependent electron attachment rate constant that has been measured in electron swarm experiments. 12 references, 2 figures.

4005 Photochemistry

REFER ALSO TO CITATION(S) 48086, 48087, 48132, 48163, 48180

48197 **(NP—6770138) Specroscopic investigations to photochemistry and photophysics of benzene in solution.** Schrader, U. (Goettingen Univ. (Germany, F.R.)). 4 Feb 1982. 106p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86770138.

Transients after the photolysis of benzene have been determined. For this, emission- and absorption spectra have been registered. A measuring apparatus has been further developed. The triplet lifetimes of diluted benzene solutions have been measured, a concentration dependence has been found. The triplet quantum yield has been determined as a function of temperature. (HK).

48198 **Gas-phase photodissociation of organometallic ions: bond energy and structure determinations.** Hettich, R.L.; Jackson, T.C.; Stanko, E.M.; Freiser, B.S. (Purdue Univ., West Lafayette, IN). *Journal of the American Chemical Society;* **108**: No. 17, 5086-5093(20 Aug 1986). Contract AC02-80ER10689.

The photodissociation of a variety of gas-phase organometallic ions was investigated with Fourier transform mass spectrometry in order to obtain spectroscopic and thermodynamic information on these complexes. The results indicate that these ionic complexes absorb broadly and photodissociate readily in the ultraviolet and visible spectral regions, with cross sections for λ/sub max/ ranging from 0.02 to 0.30 A^2. Because of this broad absorption, photodissociation thresholds are attributed to thermodynamic and not spectroscopic factors. Bond energies and heats of formation obtained by monitoring photodissociation onsets show good agreement with those obtained by other techniques. Interestingly, product ions generated by photodissociation are found to differ significantly in a number of instances from those produced by collision-induced dissociation. Finally, differentiation of two $FeC_4H_6^+$ and four $NiC_4H_8^+$ isomers is demonstrated by observing differences in cross sections, spectral band positions, and neutral losses.

48199 **Pulsed-laser flash and continuous photolysis of aqueous solutions of methyl viologen, oxalate, and their ion-pair complexes.** Prasad, D.R.; Hoffman, M.Z.; Mulazzani, Q.G.; Rodgers, M.A.J. (Boston Univ., MA). *Journal of the American Chemical Society;* **108**: No. 17, 5135-5142(20 Aug 1986).

MV^{2+} forms a 1:1 ion-pair complex (K/sub eq/ = 21 M^{-1}) with $C_2O_4^{2-}$ in aqueous solution at natural pH (7.1) that exhibits an enhanced tail absorption in the 310-400-nm region; at $\lambda < 310$ nm, the apparent molar absorptivity of the complex is approximately the same as that of uncomplexed MV^{2+}. The continuous photolysis of deaerated solutions of MV^{2+} and $C_2O_4^{2-}$ at 254-380 nm generates MV^+ initially linearly with increasing irradiation time from which values of Phi(MV^+) are obtained. Phi(MV^+) is a function of the excitation wavelength and the fraction of light absorbed by the complex and the uncomplexed substrates; there is no evidence that light absorbed by uncomplexed MV^{2+} and $C_2O_4^{2-}$ results in any net photochemistry. Pulsed-laser excitation of $C_2O_4^{2-}$ at 266 nm produces e/sub aq/$^-$ via multiphoton processes; excitation of the complex generates MV^+ within the laser pulse, followed by the formation of the second equivalent. At 355 nm, where higher concentrations of MV^{2+} are required ($\geqq$ 1 mM), the initial transient absorption generated by the laser pulse is not that of free MV^+; its enhanced absorption in the 450-500-nm region is reminiscent of that displayed by reduced-viologen dimers and aggregates. The conversion of the initial absorption to that of free MV^+ occurs via [MV^{2+}]-independent first-order kinetics; k/sub obsd/ decreases with increasing [$C_2O_4^{2-}$].

48200 **Nanosecond transient processes in the triethylamine quenching of benzophenone triplets in aqueous alkaline media. Substituent effect, ketyl radical deprotonation, and secondary photoreduction kinetics.** Bhattacharyya, K.; Das, P.K. (Univ. of Notre Dame, IN). *Journal of Physical Chemistry;* **90**: No. 17, 3987-3993(14 Aug 1986).

In the course of benzophenone triplet quenching by triethylamine (TEA) at high concentrations in alkaline aqueous acetonitrile, two temporally distinct processes are observed for ketyl radical anion formation. The fast component occurs on a nanosecond time scale, has kinetics sensitive to basicity and water content of the medium, and is ascribed to the deprotonation of the diphenylhydroxymethyl radical initially produced as a result of subnanosecond intra-ion-pair proton transfer. The slow process occurs on a microsecond time scale and is characterized by pseudo-first-order rate constants linearly dependent on ketone ground-state concentration; this is assigned to the one-electron reduction of the ketone by the methyl(diethylamino)methyl radical (derived from TEA). Substituent effects on the kinetics of the two processes follow trends expected from those of the acidity of diarylhydroxymethyl radicals and of the behavior of diaryl ketones as oxidants. Neither of the two processes is observed with N,N-dimethylaniline (DMA) and 1,4-diazabicyclo[2.2.2]octane (DABCO) as quenchers. The electron

or hydrogen transfer yields in the course of diaryl ketone triplet quenching by the three amines are all close to unity, suggesting that the back electron transfer in the triplet ion pairs is relatively unimportant.

48201 Interaction of thiols with n-type cadmium sulfide and n-type cadmium selenide in aqueous solutions: adsorption of thiolate anion and efficient photoelectrochemical oxidation to disulfides. Natan, M.J.; Thackeray, J.W.; Wrighton, M.S. (Massachusetts Institute of Technology, Cambridge). *Journal of Physical Chemistry;* **90**: No. 17, 4089-4098(14 Aug 1986).

Organic thiols, RSH = cysteamine, 2-mercaptoethanol, penicillamine, or cysteine, effectively suppress photoanodic decomposition of n-CdS and n-CdSe in aqueous solution and undergo efficient controlled potential photoelectrochemical oxidation to the corresponding disulfides, RSSR. Photovoltage greater than 700 mV is observed for certain thiols upon excitation of the semiconductor anode with light of energy greater than the band gap. As electrodes for preparative electrosynthesis, both illuminated n-CdS and n-CdSe offer significant electrical energy savings compared to conventional electrochemical oxidation in the dark at a Pt electrode. The oxidation of RSH to RSSR at n-CdS and n-CdSe has been studied under various conditions.

48202 Temperature dependence of the lifetime of excited benzyl and other arymethyl radicals. Miesel, D.; Das, P.K.; Hug, G.L.; Bhattacharyya, K.; Fessenden, R.W. (Argonne National Lab., IL). *Journal of the American Chemical Society;* **108**: No. 16, 4706-4710(6 Aug 1986). Contract W-31-109-ENG-38;AC02-76ER00038.

The temperature dependence of the fluorescence lifetime of benzyl, benzyl-d_7, α-methylbenzyl, and triphenylmethyl radicals has been studied in 2-methyltetrahydroduran from 77 to 300 K. Temperature independent and unusual temperature dependent relaxation pathways are observed for the excited states of all four radicals. Activation energies for the temperature-dependent relaxation process are $\sim$1400 cm^{-1} for all these radicals, and frequency factors are in the range of (2-20) x 10^{11} s^{-1}. For Ph_3C radicals, the temperature-dependent process leads to observable photochemistry. However, no photochemistry is observed to result from the thermally activated relaxation of benzyl radicals. Possible pathways of these nonradiative decay processes are discussed and contrasted with the weak temperature dependence for the relaxation of diphenylmethyl radicals. It is proposed that the temperature-dependent route for the radiationless decay of benzyl radicals results from differential vibronic mixing of the two excited states, the 1^2A_2 and 2^2B_2 states. Most efficient in that mixing seems to be C-C stretching vibrational modes.

48203 Infrared multiphoton dissociation of three nitroalkanes. Wodtke, A.M.; Hintsa, E.J.; Lee, Y.T. (Univ. of California, Berkeley). *Journal of Physical Chemistry;* **90**: No. 16, 3549-3558(31 Jul 1986).

Infrared multiphoton dissociation in a molecular beam has been studied in order to elucidate the collision-free thermal chemistry and dynamics of nitromethane, nitroethane, and 2-nitropropane. The isomerization of CH_3NO_2 to CH_3ONO was observed by detecting the CH_3O and NO products from the dissociation of the internally very hot, isomerized nitromethane. A novel application of RRKM theory was used to estimate the barrier height to isomerization at 55.5 kcal/mol. This method for determining barrier heights shows how a microscopic molecular beam experiment, using infrared multiphoton dissociation where the concept of temperature has no place, can be quantitatively related to pyrolysis experiments which are conducted under collisional, thermal conditions and measure phenomenological quantities such as activation energies.

48204 Molecular beam photoionization spectrometry. (1) Photoionization studies of high temperature vapors. (2) State-selected and state-to-state studies of electron transfer reactions. Liao, C.L. Ames, IA; Iowa State Univ. (1985). 193p. University Microfilms Order No. 86-04,488.Contract W-7405-ENG-82.

Thesis (Ph. D.).

Photoionization efficiency studies of high temperature vapors (S_2, Hg_2, HgKr, HgXe) have been performed using the supersonic oven beam method. These studies have yielded precise values of ionization energies of S_2, Hg_2, HgKr and HgXe and appearance energy for dissociative ionization. Dissociation energies of S_2, S_2^+, Hg_2^+, $HgKr^+$, and $HgXe^+$ and equilibrium bond distances of HgKr and HgXe have been calculated. Two Rydberg series converging to the $b^4\Sigma$/sub g/$^-$ state of S_2^+ have been observed. Window resonances resolved in the region of 650-850 A have been assigned as members of Rydberg series converging to the $c^4\Sigma$/sub u/$^-$ and $^2\Pi$/sub u/ (or $^2\Sigma$/sub u/$^-$) states of S_2^+, respectively. A new ion-neutral reaction apparatus, which combines high resolution spectrometry, crossed ion-neutral beam method and charge transfer detection, has been developed to examine the energy effects on the total charge transfer cross sections for the reaction $H_3^+(v_0') + H_2(v_0'' = 1) \rightarrow H_2(v') + H_3^+(v'')$. The vibrational state distribution of product $H_3^+(v'')$ ions in collision energy range of E/sub cm/ = 2-16 eV have been determined by the charge exchange method. A state-to-state study of fine-structure transitions in $Ar^+(^2P$/sub J/) + $Ar(^1S_0)$ charge transfer collisions have been performed. The spin-orbit effects on the charge transfer cross sections and kinetic energy dependences for the fine-structure transition probability (^2P/sub 3/2/ $\rightarrow$ ^2P/sub 1/2/ are in general agreement with the theoretical predictions.

48205 Photoemission study of the adsorption of benzotriazole on copper. Fang, B.S. Ames, IA; Iowa State Univ. (1985). 134p. University Microfilms Order No. 86-04,462.Contract W-7405-ENG-82.

Thesis (Ph. D.).

A photoemission study was performed on the chemisorption of benzotriazole (BTA) on polycrystalline copper (clean and oxidized) surfaces to understand the corrosion inhibition mechanism. The energy distribution curves indicate benzotriazole bonding to copper through nitrogen lone pair orbitals. They also disagree with the models which suggest that the benzotriazole molecular plane is oriented parallel to the copper surface by showing a lack of π-d interaction. The observed chemisorption of benzotriazole on atomically clean copper surfaces at room temperature suggests that an oxide layer is not necessary for the adsorption of benzotriazole. No structural difference was observed in the photoemission studies on BTA-clean copper and BTA-cuprous oxide surface film. This result demonstrates the major role of the copper atom upon benzotriazole adsorption. A new model of the CuBTA chemisorbed structure is presented. The Cu-BTA polymer is formed by strong charge-transfer interactions between benzotriazole molecules instead of by BTA-Cu-BTA connections. It successfully interprets the experimental results from solubility and tarnish resistance tests on adsorbed films on copper surfaces. It also gives a reasonable explanation for the different inhibition coefficients among BTA-treated copper single crystal surfaces. Mechanisms are suggested for the benzotriazole inhibition mechanisms.

48206 Photochemical properties of rhodium(III) phthalocyanine cation radicals. Ferraudi, G.; Oishi, S.; Muraldiharan, S. (Univ. of Notre Dame, IN). *Journal of Physical Chemistry;* **88**: No. 22, 5261-5264(1984).

Stable rhodium(III) phthalocyanine cation radicals, Rh(pc)$(CH_3OH)X^+$ with X = Cl or Br, were generated by one-electron chemical or electrochemical oxidations of the corresponding rhodium(III) phthalocyanines, Rh(pc) $(CH_3OH)X$, and characterized by means of their EPR and optical spectra. Some transitions in the optical spectra of the radicals were assigned by comparison with similar transitions in the spectra of the parent phthalocyanines. Moreover, the photochemical properties of the radicals were investigated by continuous, laser, and flash photolysis. Irradiations in the UV bands, λ/sub excit/ = 250 or 320 nm, induce the photoreduction of the radicals (back to the parent phthalocyanine) by abstraction of hydrogen. Photolysis in the visible region, λ/sub excit/ = 525 nm, induces the photodecomposition of the macrocycle. The mechanisms of these photoprocesses are discussed by comparison with known photochemical transformations of related compounds. 28 references, 3 figures, 1 table.

48207 **Two-frequency CO_2 laser multiple-photon dissociation and dynamics of excited state absorption in CDF_3.** Herman, I.P. (Lawrence Livermore National Lab., CA). *Chemical Physics (Amsterdam);* **75**: 121-132(1983). Contract W-7405-ENG-48.

The two-frequency multiple-photon dissociation probability in CDF_3 is studied as a function of wavelength, fluence and pulse separation using two pulsed CO_2 lasers. When the nu_6 mode of CDF_3 is excited by an R(12), 10.3 μ prepulse, the probability for subsequent dissociation is approximately constant from 940 to at least 990 cm^{-1}. A model of excited state absorption in CDF_3 is presented to help explain these results. Implications for deuterium separation are also discussed. 27 references, 11 figures, 1 table.

4006 Radiation Chemistry

REFER ALSO TO CITATION(S) 48176, 48185

48208 **Investigation of OH dynamics in the argon sensitized pulse radiolysis of water vapor.** Bera, R.K.; Hanrahan, R.J. (Department of Chemistry, University of Florida, Gainesville, Florida 32611). *Journal of Applied Physics;* **60**: No. 6, 2115-2122(15 Sep 1986).

Reactions of OH radical were studied in systems containing 650-Torr Ar and from 0.5 to 9-Torr H_2O using the method of pulse radiolysis-absorption spectroscopy. It was found that initial concentrations of OH radical increased and the half-life for its loss decreased at higher water pressures. Dependence of OH half-life on OH concentrations occurs because homogeneous OH loss processes are second order in reaction intermediates, whose concentration increases with added H_2O. A contribution by water in chaperoning OH/OH and OH/H combination is also important. The kinetic scheme was examined with a Gear integrator. A good fit of the experimental rate data was obtained using literature values for rate constants of OH+OH, OH+H, and H+H reactions, when experimental zero-time absorbance values were converted to OH concentrations based on an extinction coefficient of 6.37 x 10^4 l mol^{-1} cm^{-1} at 309.5 nm. Using the same extinction coefficient, an alternative empirical reduction of rate data gives k-italic (apparent bimolecular) for loss of OH at 650-Torr Ar pressure of 5.06 x 10^{-11} cm^3 $molec^{-1}$ s^{-1}, consistent with literature rate constants within 10%. Dependence of OH yield on water concentration is interpreted on a two state model for argon precursor, involving short-lived (resonance state) Ar^* (^{1}P-italic$_1$ and ^{3}P-italic$_1$) and longer-lived (metastable) Ar^{**} (^{3}P-italic$_2$ and ^{3}P-italic$_0$). Adjustment of assumed initial Ar^* and Ar^{**} concentrations allowed prediction of measured OH concentrations within experimental error at all water pressures studied.

48209 **Radiation-induced cationic polymerization of limonene oxide, α-pinene oxide, and β-pinene oxide.** Aikins, J.A.; Williams, F. (Univ. of Tennessee, Knoxville). *ACS Symposium Series;* **286**: No. 24, 335-359(1985).

From 187. meeting of the American Chemical Society; St. Louis, MO, USA (8-13 Apr 1984).

After suitable drying, the subject monomers in the form of neat liquids undergo radiation-induced polymerization with no apparent side reactions and high conversions to precipitatable polymers of low molecular weights. A high frequency of chain (proton) transfer to monomer is indicated by the fact that the kinetic chain lengths are estimated to be several hundred times larger than the range of DP/sub n/ values (12-4). Structural characterization of the limonene oxide polymer by ^{1}H and ^{13}C NMR spectroscopy provides conclusive evidence that the polymerization proceeds by the opening of the epoxide ring to yield a 1,2-trans polyether. Similar NMR studies on the polymers formed from the α-pinene and β-pinene oxides show that the opening of the epoxide ring for these monomers is generally accompanied by the concomitant ring opening of the cyclobutane ring structure to yield a gem-di-methyl group in the main chain.

4007 Radiochemistry And Nuclear Chemistry

REFER ALSO TO CITATION(S) 48085, 48139, 48674

48210 **(PNL—5948) List of DOE radioisotope customers with summary of radioisotope shipments, FY 1985.** Baker, D.A. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1986. Contract AC06-76RL01830. 51p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014817.

This document describes radioisotope distribution from DOE facilities to private firms including foreign and other DOE facilities. The information is divided into five sections: (1) isotope suppliers, facility contacts, and isotopes or services supplied; (2) customers, suppliers, and isotopes purchased; (3) isotopes purchased cross-referenced with customer numbers; (4) geographic locations of radioisotope customers; and (5) radioisotope sales and transfer - FY 1985.

48211 **Radiation-induced redox specification of sup(77)Br in aqueous solution as determined by anion chromatography.** Wanek, P.M.; Grant, P.M. (Los Alamos National Lab., NM, USA). **99**: No. 1, 187-192(May 1986).

sup(77)Br is of potential use in diagnostic nuclear medicine as the parent of ultrashort-lived sup(77m)Se in a radioisotopic generator systems. The chemical forms(s) of the radiobromine in aqueous solution, and their radiation-induced chemical transformations, are of importance for biomedical generator development. Approximately 150 mCi of radiobromine, initially present as Brsup(-) was studied over a period of three weeks and analyzed for BrOsub(x)sup(-) (x=0-4) by anion exchange chromatography. Radiolysis of the solution gave rise to a small quantity of BrOsub(3)sup(-), but 99.5% of the activity remained as bromide. 15 refs.

4008 Combustion, Pyrolysis, And High-temperature Chemistry

REFER ALSO TO CITATION(S) 48194, 48324

48212 **(BR—96547) Catalytic combustion in a transient high pressure facility. M.S. Thesis.** Baxter, D.R.J. (Southampton Univ. (UK)). Jul 1985. 181p. NTIS, PC A09/MF A01.

Temperature and composition measurements from experiments on the catalytic combustion of weak mixtures of hydrogen, methane, ethylene and liquid propane, in air initially at pressures up to 60 bar and temperatures up to 820 K are presented and are compared with a simple, theoretical model. The facility was not capable of sustaining catalytic combustion of methane at the test conditions available, but catalytic reactions were obtained using the other fuels tested. Premixed and injected fuels were studied, with the quantitative work concentrating on ethylene injection into air flows to give fully mixed equivalence ratios of 0.1 to 0.2. Results show that the transient facility produces high temperature and pressure air flows sufficiently steady to sustain surface oxidation processes. It is also possible to obtain relevant measurements of temperature and gas composition within the run period of 1 sec.

48213 **(N—86-24961) Characterization of simulated small-droplet fuel sprays.** Ingebo, R.D. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. 10p. (NASA-TM—87286; E—2987; CONF-8606184—1). NTIS, PC A02/MF A01.

From 22. joint propulsion conference; Huntsville, AL, USA (16 Jun 1986).

A two-fluid pneumatic atomizer operating at relatively high liquid and gas pressures produced water sprays that simulated small-droplet clouds of liquid fuel for use in studying vaporization and fuel-air mixing effects on combustor performance and emissions. To characterize the sprays, a scattered-light scanning instrument was developed and measurements of volume median or volume mean diameter, D sub V.5, were correlated with D sub O, W sub w, and W sub n, i.e., orifice diameter, water, and nitrogen gas flow rates, respectively, to give the general expression: D sub v.5 approx. (D sub o sup 0.2) (W sub w sup m) (W sub n sup n),

which yields D sub v.5 = 45 (D sub o sup 0.2) (W sub w sup 0.2) (W sub w sup - 1.2). Values of D sub o, W sub w, and W sub n are in centimeters and grams/second, respectively. Farther downstream at an axial distance of 6.7 cm, exponent m increased from 0.2 to 0.4 and exponent n decreased from -1.2 to -1.0 and at a distance of 25 cm downstream of the atomizer, n decreased to -0.8. The increase in exponent m and decrease in exponent n was attributed to a loss of very small droplets from the spray due primarily to vaporization and diffusion effects on clouds of small droplets traveling a distance of 25 cm.

48214 **(N—86-25429) Mass spectrometric gas composition measurements associated with jet interaction tests in a high-enthalpy wind tunnel.** Lewis, B.W.; Brown, K.G.; Wood, G.M.,JR.; Puster, R.L.; Paulin, P.A.; Fishel, C.E.; Ellerbe, D.A. (National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center). Jun 1986. 33p. (NASA-TM—87642; L—16074). NTIS, PC A03/MF A01.

Knowledge of test gas composition is important in wind-tunnel experiments measuring aerothermodynamic interactions. This paper describes measurements made by sampling the top of the test section during runs of the Langley 7-Inch High-Temperature Tunnel. The tests were conducted to determine the mixing of gas injected from a flat-plate model into a combustion-heated hypervelocity test stream and to monitor the CO_2 produced in the combustion. The Mass Spectrometric (MS) measurements yield the mole fraction of N_2 or He and CO_2 reaching the sample inlets. The data obtained for several tunnel run conditions are related to the pressures measured in the tunnel test section and at the MS ionizer inlet. The apparent distributions of injected gas species and tunnel gas (CO_2) are discussed relative to the sampling techniques. The measurements provided significant real-time data for the distribution of injected gases in the test section. The jet N_2 diffused readily from the test stream, but the jet He was mostly entrained. The amounts of CO_2 and Ar diffusing upward in the test section for several run conditions indicated the variability of the combustion-gas test-stream composition.

48215 **(N—86-25431) Ignition delay times of benzene and toluene with oxygen in argon mixtures.** Burcat, A.; Snyder, C.; Brabbs, T. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). May 1985. 15p. (NASA-TM—87312; E—3041). NTIS, PC A02/MF A01.

The ignition delay times of benzene and toluene with oxygen diluted in argon were investigated over a wide range of conditions. For benzene the concentration ranges were 0.42 to 1.69 percent fuel and 3.78 to 20.3 percent oxygen. The temperature range was 1212 to 1748 K and the reflected shock pressures were 1.7 to 7.89 atm. Statistical evaluation of the benzene experiments provided an overall equation which is given. For toluene the concentration ranges were 0.5 to 1.5 percent fuel and 4.48 to 13.45 percent oxygen. The temperature range was 1339 to 1797 K and the reflected shock pressures were 1.95 to 8.85 atm. The overall ignition delay equation for toluene after a statistical evaluation is also given. Detailed experimental information is provided.

48216 **(UCRL—94731) Solid combustion processes for improved synthesis of non-oxide materials.** Holt, J.B. (Lawrence Livermore National Lab., CA (USA)). 13 Jun 1986. Contract W-7405-ENG-48. 8p. (CONF-860893—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014434.

From International symposium on fundamental research strategy in the development of new materials for efficient energy conversion; Osaka, Japan (25 Aug 1986).

Combustion Synthesis takes advantage of the heat evolved during the chemical reaction between mixtures of solids or solids and gases. The quantity of heat released varies widely according to the particular chemical system. If the reaction is carried out in the combustion mode, then the product is raised to a high temperature by a rapidly moving combustion wave. This simple concept is the basis of a new low-cost approach to the synthesis of many refractory materials. The unique characteristics of this combustion process are the high temperatures (2000 to 3500°C) that are generated without the use of external energy, the rapidly moving combustion wave (0.1 to 10 cm/s), the high rate of heating at the combustion front (10^4 to 10^6 °C/s) and volatilization of cation impurities at the combustion front. Our research clearly demonstrates that the Solid Combustion Process has potential as a method to synthesize many high-quality refractory materials by cost-effective methods.

48217 **Thermal decomposition of benzene on the Rh(111) crystal surface.** Koel, B.E.; Crowell, J.E.; Bent, B.E.; Mate, C.M.; Somorjai, G.A. (Univ. of Colorado, Boulder). *Journal of Physical Chemistry;* 90: No. 13, 2949-2956(19 Jun 1986). Contract AC03-76SF00098.

Benzene decomposition on the Rh(111) crystal surface has been studied over the temperature range of 300-800 K by high-resolution electron energy loss spectroscopy (HREELS), temperature-programmed desorption (TPD), and low-energy electron diffraction (LEED). Our results show that benzene decomposition begins at 400 K, forming a mixture of CH and C_2H species. The relative amounts of these two species vary with temperature; at 470 K, the concentration ratio of CH to C_2H is 0.4. Above 500 K, these fragments dehydrogenate and condense to form C/sub n/H polymers. By 800 K, the adsorbed monolayer is completely dehydrogenated, forming a polymeric carbon monolayer with a vibrational spectrum similar to that of an ordered graphite monolayer. The authors propose that benzene decomposition on Rh(111) proceeds by decyclotrimerization to form three acetylenes which immediately decompose to CH and C_2H species.

48218 **Symposium (International) on Combustion, 20th, University of Michigan, Ann Arbor, MI, August 12-17, 1984, Proceedings.** Pittsburgh, PA; Combustion Institute (1985). 2235p. (CONF-840801—).

From 20. international symposium on combustion; Ann Arbor, MI, USA (12 Aug 1984).

The present conference on combustion phenomena considers topics in automotive engine combustion, turbulent reacting flows, the modeling of practical combustion systems, reaction kinetics, combustion-generated particulates, combustion diagnostics, coal combustion process characteristics, fire-related phenomena, explosion/detonation phenomena, spray combustion, ignition/extinction, laminar flames, pollutant formation processes, practical combustor devices, and rocket propellant combustion. Attention is given to the contributions of combustion science to piston engine design, modeling and measurement techniques for turbulent combustion, the specific effects of energy, collisions, and transport processes in combustion chemistry kinetics, the formation of large molecules, particulates and ions in premixed hydrocarbon flames, the application of laser diagnostics to combustion systems, spark ignition energies for dust-air mixtures, the controlling mechanisms of flow-assisted flame spread, the ignition and combustion of coal-water slurries, spontaneous ignition of methane, turbulent and accelerating dust flames, and the temperature sensitivity of double base propellants.

48219 **Measurements of superequilibrium hydroxyl concentrations in turbulent nonpremixed flames using saturated fluorescence.** Drake, M.C.; Pitz, R.W.; Lapp, M.; Fenimore, C.P.; Lucht, R.P. (General Electric Co., Schenectady, NY; Purdue Univ., West Lafayette, IN). pp 327-335 of Symposium (International) on Combustion, 20th, University of Michigan, Ann Arbor, MI, August 12-17, 1984, Proceedings. Pittsburgh, PA; Combustion Institute (1985). (CONF-840801—).

From 20. international symposium on combustion; Ann Arbor, MI, USA (12 Aug 1984).

The first quantitative, time- and space-resolved measurements have been obtained for probability density functions of OH concentration in nonpremixed flames. Measurements using single-pulse, laser-saturated fluorescence in laminar, transitional, and turbulent nonpremixed H2-air flames provide unambiguous evidence for substantial OH superequilibrium concentrations, in qualitative agreement with predictions of laminar and turbulent combustion models. The average degree of superequilibrium, OH/OH(AE), is typically 4-5 near the jet exit and approaches unity far downstream. The maximum instantaneous OH concentration measured in transitional and turbulent H2-air flames is about 6 x 10 to the 16th molecules/cc, in accord with the maximum determined by partial equi-

librium thermodynamic calculations and with the maximum OH concentrations measured in premixed H2-air flames. 29 references.

48220 Variational transition state theory and tunneling calculations of potential energy surface effects on the reaction of $O(^3P)$ with H_2. Truhlar, D.G.; Runge, K.; Garrett, B.C. (Univ. of Minnesota, Minneapolis). 585-594(1984). Contract AC02-79ER10425.

Variational transition state theory with adiabatic and least-action ground-state transmission coefficients is applied to calculate reaction rates for $O(^3P) + H_2 \rightarrow OH + H$ in both collinear and three-dimensional worlds for temperatures of 200-1400 K. Five different potential energy surfaces are considered. The collinear studies are used to assess the accuracy of the dynamical and energetic approximations, which include the no-recrossing assumption of generalized transition state theory, semiclassical methods for tunneling calculations, and a Morse approximation for quantizing the generalized-transition-state stretching vibrations. Although the potential energy surfaces show wide differences in behavior, the calculations with least-action ground-state transmission coefficients agree with the accurate quantal results within a factor of 2.8 in all cases. The authors find that the three-dimensional reaction is dominated by tunneling at room temperature and nearby for all five surfaces. For the calculations on the most accurate ab initio potential energy surface, 60% of the ground-state reaction proceeds by tunneling even at 400 K. The tunneling fractions rise dramatically as the temperature is lowered. The calculations show that the quantitative estimation of the tunneling effects requires consideration of reaction-path curvature and of tunneling paths that deviate from the minimum energy path. 34 references, 4 figures, 3 tables.

48221 High-temperature oxidation of H_2 on a platinum catalyst. Brown, N.J.; Schefer, R.W.; Robben, F. (Lawrence Berkeley Lab., CA). *Combustion and Flame;* **51**: 263-277(1983). Contract W-7405-ENG-48.

The high-temperature surface oxidation of H_2 on a platinum catalyst in the presence of excess air has been studied over a range of surface temperatures from 450 to 1070K and equivalence ratios from 0.05 to 0.20. the objectives were (1) to develop a system in which the surface kinetics of various fuel-air mixtures can be studied under conditions of interest to catalytic combustion and (2) to determine the high-temperature surface oxidation rate for lean H_2/air mixtures on a platinum catalyst. The experimental system considered was the laminar boundary layer of a heated catalytic plate. Under all conditions investigated the surface reaction rapidly became diffusion limited downstream of the plate leading edge. A finite difference scheme was utilized to model numerically the flow field above the plate surface. This enabled surface reaction rate data to be obtained under those conditions where surface reaction rates were significantly influenced by transport effects. Based on a one-step model for H_2 oxidation the data were found to correlate well with a reaction rate expression of the form R/sub s/ = 1.4 x $10^3[H_2]$/sub s/ exp(-3850/RT) (mole/cm^{2}s). The effects of heat and mass transfer on the kinetics are also discussed. 18 references, 10 figures.

42 ENGINEERING

48222 (LA—10788-MS) Bumper shield analysis. Oyer, A.T. (Los Alamos National Lab., NM (USA)). Jul 1986. Contract W-7405-ENG-36. 36p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014878.

To initially examine the effectiveness of a shield surrounding a reentry vehicle, we used the hypervelocity hydrodynamic impact code, LASOIL. We completed a four-by-four matrix of 16 two-dimensional numerical impact simulations of 1-g tungsten cylinders striking circular plates. The variable parameters were the projectile impact velocity (10, 20, 40, and 80 km/s) and the plate thickness (1, 2, 4, and 8 mm). In each case, the projectile was destroyed in the impact. The shield was penetrated but retained negliible momentum from the impact. The resultant debris cloud was low-density debris and vapor.

4201 General Engineering

REFER ALSO TO CITATION(S) 48285

48223 (UCID—20808) Robust line width estimation. Fitch, J.P.; Portnoff, M.R. (Lawrence Livermore National Lab., CA (USA). Signal and Image Processing Research Group). Jul 1986. Contract W-7405-ENG-48. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014748.

Fabrication of diffused titanium optical guides on a $LiNbO_3$ crystal substrate requires precise quality assurance. Light couplers in particular must be positioned within micron specifications. This requirement is the reason that the width of lines detected during microscopic inspection of the crystal is such an important parameter for quality evaluation. To assist in the inspection of these optical guides, a line width estimation program has been developed for an IBM PC based microscope inspection system. A digital image processing approach is used to develop an algorithm which can be tailored by the user for specific signal and noise characteristics. Default filter parameters, which can be updated and saved interactively by the user, are stored in a file on disk. The final program can be executed stand-alone or through a commercially available, menu-driven, image processing software package. Details concerning the implementation of this program are presented in this report. These include instructions for using the program, a description of the voting approach to edge detection, and a discussion of the line fitting subroutine. 5 refs., 1 fig. (DWL)

48224 (UCRL—94092) Silicon diffraction gratings for multilayer structures. Ciarlo, D.R.; Miller, D.E. (Lawrence Livermore National Lab., CA (USA)). 20 Jun 1986. Contract W-7405-ENG-48. 11p. NTIS, PC A02. File Number DE86014446.

Anisotropic etching was used to fabricate diffraction gratings on silicon wafers for use as substrates for layered synthetic multilayers. We worked with (110 and (100) oriented wafers to achieve etched sidewall angles of 35.3°, 46.5°, 54.7°, and 90°. Contact lithography was used to print grating with a 20μ period in order to evaluated the quality of the etched sidewalls. Projections lithography was used to print grating with a 2μ period. Blazed grating were fabricated from (111) oriented wafers cut 6° off the normal to the growth direction. a crystal alignment techniques is described that allowed us to align the gratings to better than 0.1° of the correct crystal direction. Measurements are reported on the smoothness of etched silicon surfaces using three different etches.

48225 (Y/CM—0008) Oak Ridge Y-12 Plant Computer Integrated Manufacturing Strategic Plan (FY 1986-1992): a working document. (Oak Ridge Y-12 Plant, TN (USA)). Sep 1985. Contract AC05-84OS21400. 386p. NTIS, PC A17/MF A01; 1; GPO Dep. File Number DE86014426.

The Y-12 Computer-Integrated Manufacturing (CIM) Program is managing the migration of the plant's CIM infrastructure from today's environment to an integrated, highly flexible, and more responsive manufacturing architecture planned for the 1990s. The program is committed to: (1) meeting DOE CIM directives, and (2) improving the manufacturing performance of the Y-12 Plant. The CIM Program charter in Y-12 is to improve manufacturing performance through integrated computer and communication technologies such that the plant's ability to meet its current and future manufacturing objectives is significantly enhanced. To achieve this goal, CIM technologies are being applied in two primary areas: (1) automation of manufacturing processes, and (2) automation of information of information systems. The objectives of the CIM Program are as follows: Meet DOE CIM directives; Reduce product cost; Meet production schedules with minimum contingency costs; Improve product quality via quality assurance at the point of origin; Minimize in-process inventory and improve inventory control; Reduce product lead time; Improve production flexibility.

4202 Facilities And Equipment

REFER ALSO TO CITATION(S) 47196, 47284, 47830, 48022, 48313, 49566

48226 **(BMFT-FB-T—86-023) Welding on water-filled pipes for drilling and repairing of mains for district heating. Final report.** Fleig, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1986. 120p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752551.

Normally, up to now, mains for district heating run with water were shut down and emptied before welding in order to construct new branch connections or to repair damaged pipes. For certain constructions and operating conditions it could be proved that the strength of welded connections on a water filled pipe are of no lower quality than that on an emptied pipe if special welding conditions are regarded. In addition tests with two different drilling machines showed that on principle the technique of drilling mains, proved in gas and water supply, can be used in district heating too. Based on the conclusions of the tests welding and drilling jobs generally require no restrictions in operating the main. Endangering of the operators is not to be expected. With 14 refs., 8 tabs., 49 figs.

48227 (CONF-841187—Vol.2, pp 629-636) **Mobile laboratory for near real-time measurements of very low-level radioactivity.** Sigg, R.A. (E.I. du Pont de Nemours and Co., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC09-76SR00001.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Tracking Radioactive Atmospheric Contaminants (TRAC) System is a mobile laboratory, developed by Savannah River Laboratory (SRL) to improve emergency response and environmental research capabilities at the Savannah River Plant (SRP). In the event of an atmospheric release, the TRAC laboratory can confirm the location and radionuclide composition of the downwind cloud by analyzing samples in near real-time in the field. Specialized monitoring systems were developed to analyze most radionuclides produced in SRP's diverse operations. Sensitivities are radionuclide dependent and can be 10^{-5} of maximum permissible concentration (MPC) values.

48228 (CONF-841187—Vol.2, pp 753-769) **Environmental protection during construction of the defense waste processing facility at the Savannah River plant.** Boone, F.W. (E. I. du Pont de Nemours and Co., Savannah River Plant, Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Defense Waste Processing Facility (DWPF) is under construction on a site located in the central portion of the Savannah River Plant (SRP). The site is in a wooded, upland area southeast of Upper Three Runs Creek (UTRC). Construction activities have or will disturb approximately 200 acres of forest land in the site area which drain toward UTRC. For this reason extensive plans were developed and implemented for erosion and sedimentation control, including diversion of upland drainage and ground water pumped from de-watering activities, treatment of exposed areas including temporary and permanent revegetation of disturbed areas, and collection of runoff from disturbed areas in appropriately sized sedimentation basins. Overflow from these basins as well as selected parameters prior to discharge to UTRC. An oil spill prevention and countermeasures plan was developed and implemented for the site including administrative controls, diking of all fuel oil and waste oil storage facilities as well as the construction vehicle maintenance area. Storm water runoff from the primary facilities is routed through an oil separator prior to discharge to an NPDES permitted outfall to UTRC. All waste oil is collected and disposed of following site-wide hazardous waste management procedures. A concrete batch plant is located on the site to provide construction grade concrete for the facilities. This plant is equipped with an exhaust ventilation system including two filter baghouses. A two stage decant structure is included in the facility under a Bureau of Water Pollution Control DHEC permit to remove solids from the washdown of concrete transit mixer trucks and the batch plant. The waste water is discharged through an NPDES outfall to UTRC.

48229 **(LA-UR—86-1076) Analysis of magnetic refrigerators with external regeneration.** Overton, W.C. Jr.; Barclay, J.A. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 8p. (CONF-860962—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86008757.

From International Institute of Refrigeration (CRYOPRAGUE); Prague, Czechoslovakia (8 Sep 1986).

The central idea of the magnetic refrigeration systems analyzed in this paper is that of a MR having a regenerator composed of an integral number of separate stages but having only a single magnetic stage. In principle, each stage is thermally isolated from the others, but the stages are accessed by a manifold and valve system which allows gas to flow between the MM and the individual stages. The concept therefore is distinctly unlike that of the unusual continuous regenerator of gas refrigerators. Although a small amount of gas in the manifold is responsible for the actual transfer of heat between elements of the REGMR, it is clear from the cycle description in the caption of Fig. 1 that the fixed mass of the MM is analogous to a fixed mass of a working fluid in a gas refrigerator or engine. Both, in effect, are carried thermally through all parts of their respective systems.

48230 **(LA-UR—86-2352) Rail guns driven by helical flux compression generators.** Fowler, C.M.; Zimmermann, E.L.; Cummings, C.E.; Davidson, R.F.; Foley, E.; Fox, W.E.; Kerrisk, J.F.; Parker, J.V.; Parson, W.M.; Schnurr, N.M. (Los Alamos National Lab., NM (USA); IAP Research, Inc., Dayton, OH (USA)). 1986. Contract W-7405-ENG-36. 8p. (CONF-860703—13). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013853.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

Explosively-driven helical flux compression generators are generally of larger inductance and therefore of higher energy gain than most other flux compression generators. On the other hand the operation times (usually 200 to 300 μs or less) are usually too short to serve as direct power supplies for most rail gun applications. This limitation is circumvented, however, when the generator is used to charge an inductive storage coil, which then serves as the rail-gun energy source. We describe here the results of several recent tests with such systems. Projectile masses have ranged from 0.6 to 1.0 kg; both plasma and solid armature modes have been employed. The flux compression generator and its characteristics are describeed, together with the storage coil, the rail gun, projectiles and diagnostics employed. Particular attention is devoted to minimizing flux losses, for example, in the design of the storage coil input crowbar which is activated after the coil is loaded by the generator.

48231 **(LA-UR—86-2371) Conceptual design for a short-pulse explosive-driven generator.** Caird, R.S.; Fowler, C.M. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 8p. (CONF-860703—16). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013851.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

A design is described for a short-pulse explosive-driven generator. The initial flux is provided by a side-fed one-turn coil that is crow-barred at peak field. This field is then compressed by the axially uniform expansion of a cylindrical armature inside the coil. A multistrand helical coil is used to convert the changing flux to voltage at the coaxial output. The circuit is completed by the impact of the armsture against contact rings connected to the helical coil and output. An approximate circuit model is derived. The analysis indicates that several megajoules can be delivered to an inductive load in 0.5 to 5.0 μs.

48232 (LA-UR—86-2378) Experiments with multi-megampere explosively formed fuses in cylindrical geometry. Goforth, J.H.; Marsh, S.P.; Lindemuth, I.; Kruse, H.W. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 9p. (CONF-860703—18). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013848.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

Taking advantage of the high energy density attainable in the magnetic field of an inductor requires a prime power source capable of producing very large currents and a means of extracting the energy as a fast current pulse from the inductive store. Many existing high current sources have pulse risetimes of hundress of microseconds, while most pulsed power applications have submicrosecond pulse requirements. In principle, high current opening switches represent a good solution to the problem. An inductor is charged over a long period of time by a relatively slow current supply with a closed switch completing the circuit. At a desired time, the switch is opened and the voltage produced transfers current rapidly to a load circuit. In practice, building opening switches that will carry multimegampere currents for hundreds of microseconds and then open on a submicrosecond time scale has posed an extremely difficult problem. Explosive-driven opening switches have been used in long-pulse applications for some time, but until recently the explosives systems used to drive these devices would not produce a rapidly opening switch. We have developed a fast technique for interrupting large currents by using explosives to extrude short sections of relatively thick conductors into long thin fuse-like conductors. Although the formation of the fuse requires about 2 μs, the switch will sustain considerable voltage as its resistance rises, and it is feasible to deliver pulses with ~ 1 μs risetimes to low inductance loads. We discuss here the small scale proof of principle experiments and 2-D hydrodynamics calculations that have led to an optimized cylindrical opening switch design. In addition, we will describe the results of testing a cylindrical switch at currents up to 4.6 MA, and give extrapolations for device designs for the 15 to 20 megampere range.

48233 (LA-UR—86-2507) Testing of the Mark 101 magnetic flux compression generator. Freeman, B.L.; Fowler, C.M.; King, J.C.; Martinez, A.R. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 6p. (CONF-860703—12). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013833.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

The Mark 101 explosive flux compression generator is a line-initiated, vacuum/magnetically insulated, helical generator. This device offered some unique challenges in transforming the theoretical design into a testable experiment. The two main reasons for this are that in theory an eight-turn, four-wire Mark 101 possesses a terminal dL/dt of ~0.5 Ω and operates with electric fields which are greater than the threshold for electron field emission. With this in mind, we designed an integral vacuum-jacket-generator configuration with a passive load inductance of ≤0.5 μH. The generator contained ~8 μH of initial inductance. The field emission required the stator to be entirely sealed within the vacuum jacket. The open, helical stator resulted in the presence of non-trivial leakage fields and voltages. To accommodate these fields, the vacuum chamber for the generator was segmented and axially insulated with rings of acrylic, similar to stacked-ring diodes. We made no attempt to break the azimuthal metal surfaces due to the physical difficulty this would incur. Diagnostics included an input current Rogowski loop, a load Rogowski loop, two dB/dt probes in the load, a Faraday fiber-optic current sensor, and two dB/dt probes in the region between the stator winding and the vacuum jacket to measure the leakage azimuthal and axial magnetic fields. The results of explosive tests are presented.

48234 (N—86-25305) Thermal performance evaluation of the infrared telescope dewar subsystem. Urban, E.W. (National Aeronautics and Space Administration, Huntsville, AL (USA). George C. Marshall Space Flight Center). Apr 1986. 127p. (NASA-TM—86543). NTIS, PC A07/MF A01.

Thermal performance evaluations (TPE) were conducted with the superfluid helium dewar of the Infrared Telescope (IRT) experiment from November 1981 to August 1982. Test included measuring key operating parameters, simulating operations with an attached instrument cryostat and validating servicing, operating and safety procedures. Test activities and results are summarized. All objectives are satisfied except for those involving transfer of low pressure liquid helium (LHe) from a supply dewar into the dewar subsystem. 1 reference.

48235 (NE-F—3-42-7-86) Operating policy of DOE filter test program. Revision. (Oak Ridge National Lab., TN (USA)). 31 Jul 1986. Contract AC05-84OR21400. 9p. N.S.M.C., Box Y, Oak Ridge, TN 37831. File Number TI86013424.

This standard establishes policies and procedures for the operation of the US Department of Energy (DOE) Filter Test Facilities (FTF) at Oak Ridge, Tennessee; Golden, Colorado; and Richland, Washington. This standard also establishes DOE-wide HEPA filter procurement, HEPA filter testing, and to the degree stated, respirator canister testing policies.

48236 (NE-F—3-43-7-86) Quality assurance testing of HEPA filters. Revision. (Oak Ridge National Lab., TN (USA)). 31 Jul 1986. Contract AC05-84OR21400. 33p. Nuclear Standards Management Center, Box Y, Oak Ridge, TN 37831. File Number TI86013422.

This standard covers requirements for the quality assurance inspection and testing of HEPA filters and respirator canisters by the US Department of Energy (DOE) Filter Test Facilities (FTFs) at Oak Ridge, Tennessee; Golden, Colorado; and Richland, Washington. The standard implements the policies established in NE F 3-42, "Operating Policy of DOE Filter Test Programs," and provides a basis for the preparation of written procedures for conducting primary FTF functions. As noted in NE F 3-42, Sec. 4, these standards apply only to filters used at DOE installations for health or environmental protection purposes. These filters are described as "Type B" filters in Institute of Environmental Sciences, IES RP-CC-001-86, "Recommended Practices for HEPA Filters."

48237 (NE-F—3-44-7-86) DOE filter test facilities quality program plan. Revision. (Oak Ridge National Lab., TN (USA)). 25 Jul 1986. Contract AC05-84OR21400. 7p. N.S.M.C., Box Y, Oak Ridge, TN 37831. File Number TI86013388.

This standard covers requirements for the quality assurance inspection and testing HEPA filters and DOE filter test facilities.

48238 (ORNL/TM—9889) Summary of the technical review of the safety analysis reports for packaging (SARP) for the transnuclear transport/storage casks: TN-BRP and TN-REG. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 137p. NTIS, PC A07/MF A01; GPO Dep. File Number DE86014394.

The Safety Analysis Reports for Packaging for two spent fuel shipping casks were technically reviewed by the Oak Ridge National Laboratory. The casks were designed by Transnuclear, Inc., for shipment of 85 Big Rock Point boiling water reactor fuel elements and 40 R.E. Ginna pressurized water reactor fuel elements from West Valley, New York, to Idaho Falls, Idaho. The intent of the review was to ensure compliance of the casks with the requirements the applicable Federal Regulations contained in 10 CFR Pt. 71 and allow issuance of Department of Energy Certificates of Compliance for transport by the Department of Energy Idaho Operations Office. The review was performed by a team of Oak Ridge National Laboratory staff assembled for their expertise in criticality analysis, shielding, metallurgy, nondestructive testing, thermal analysis, structural analysis, and containment. This report describes the review processes, the findings in each technical area, and the overall conclusion that a Certificate of Compliance could be issued for the proposed single shipment under the specified conditions and constraints.

48239 (ORNL/TM—9923, pp 17-34) **Multiple levels of representation and problem-solving using maps from sonar data.** Elfes, A. (Carnegie-Mellon Univ., Pittsburgh, PA). Jan 1986. NTIS, PC A09/MF A01. File Number DE86006813. (CONF-8508163—).

From 2. DOE/CESAR workshop on planning and sensing for autonomous navigation; Los Angeles, CA, USA (18 Aug 1985).

A sonar-based mapping and navigation system for autonomous mobile robots operating in unknown and unstructured surroundings is described. The system uses sonar range data to build a multi-leveled and multi-faceted description of the robot's operating environment. Sonar maps are represented in the system along several dimensions: the Abstraction axis, the Geographical axis, and the Resolution axis. Different kinds of problem-solving activities can be performed and different levels of performance can be achieved by working with these multiple representations of maps. The major modules of the Dolphin system are described and related to the various mapping representation used. The system is also situated within the wider context of developing an advanced software architecture for autonomous mobile robots.

48240 (ORNL/TM—9923, pp 35-60) **Synthesis of digital machines with provable epistemic properties.** Rosenschein, S.J.; Kaelbling, L.P. (SRI International, Menlo Park, CA). Jan 1986. NTIS, PC A09/MF A01. File Number DE86006813. (CONF-8508163—).

From 2. DOE/CESAR workshop on planning and sensing for autonomous navigation; Los Angeles, CA, USA (18 Aug 1985).

Many artificial intelligence applications involve the design of systems intended to track and react to conditions in their physical environments in real time. Real-time performance is difficult to achieve using traditional AI techniques because of their reliance on expensive runtime symbolic inference. This problem is addressed by describing a mathematical framework and design tools for analyzing and synthesizing machines with compiled knowledge. The concept of knowledge is formulated mathematically in terms of the relationship between states of a machine and states of its environment over time. The design approach is based on the use of metaprograms to compute a machine description which can then be transformed either into physical circuitry or into code that simulates the described machine. The compilation of knowledge is facilitated by parameterizing machine constructors by other machine constructors and by objects usually encoded as runtime structures.

48241 (ORNL/TM—9923, pp 61-83) **Intelligent machine operating system for hypercube ensemble architectures.** Barhen, J. (Oak Ridge National Lab., TN). Jan 1986. NTIS, PC A09/MF A01. File Number DE86006813. (CONF-8508163—).

From 2. DOE/CESAR workshop on planning and sensing for autonomous navigation; Los Angeles, CA, USA (18 Aug 1985).

The research involving the development of dynamic resource allocation (scheduling and load-balancing) algorithms in a virtual time environment is described. These algorithms will be embedded into a virtual time intelligent machine operating system. The emphasis is on applications characterized by structures irregular in time and space, with irregularities unpredictable in advance, and which might be as often communication-bound as compute-bound. Since the ultimate objective is to exploit advanced computer architectures for machine intelligence problems, the generic IMOS/VT methodology is targeted at a wide spectrum of concurrent computation requirements, extending from coarse-grain architectures to fine-grain connection-machine-type systems. The current implementation framework focuses on hypercube ensembles.

48242 (ORNL/TM—9923, pp 85-93) **Planning for transit in unknown natural terrain.** Harmon, S.Y. (Naval Ocean Systems Center, San Diego, CA). Jan 1986. NTIS, PC A09/MF A01. File Number DE86006813. (CONF-8508163—).

From 2. DOE/CESAR workshop on planning and sensing for autonomous navigation; Los Angeles, CA, USA (18 Aug 1985).

The Ground Surveillance robot (GSR) development has reached a stage where a route planning system is potentially useful. The GSR's route planning problem can be solved by having a generalized planning engine operate upon a data base containing orienteering knowledge and models of the vehicle and the surrounding environment. Orienteering knowledge contains heuristics for position finding, route planning and route following in undeveloped terrain. Some orienteering hints valuable to an autonomous vehicle planning transit through unknown undeveloped territory are discussed. In addition, the requirements for a sufficient planning mechanism to support autonomous for a sufficient planning mechanism to support autonomous transit through unknown natural terrain are also discussed.

48243 (ORNL/TM—9923, pp 95-120) **O-theory - a hybrid uncertainty theory.** Oblow, E.M. Jan 1986. NTIS, PC A09/MF A01. File Number DE86006813. (CONF-8508163—).

From 2. DOE/CESAR workshop on planning and sensing for autonomous navigation; Los Angeles, CA, USA (18 Aug 1985).

A hybrid uncertainty theory is developed to bridge the gap between fuzzy set theory and Bayesian inference theory. Its basis is the Dempster-Shafer formalism (a probability-like, set-theoretic approach), which is extended and expanded upon so as to include a complete set of basic operations for manipulating uncertainties in approximate reasoning. The new theory, operator-belief theory (OT), retains the probabilistic flavor of Bayesian inference but includes the potential for defining a wider range of operators like those found in fuzzy set theory. The basic operations defined for OT include those for: dominance and order, union, intersection, complement and general mappings. A formal relationship between the membership function in fuzzy set theory and the upper probability function in fuzzy set theory and the upper probability function in the Dempster-Shafer formalism is also developed. Several sample problems in logical inference are worked out to illustrate the results derived from this new approach as well as to compare them with the other theories currently being used. A general method of extending the theory using the historical development of fuzzy set theory as an example is suggested.

48244 (UCID—20842) **Experimental data for EM coupling through slots.** King, R.J.; Hudson, H.G. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 129p. NTIS, PC A07/MF A01; GPO Dep. File Number DE86015011.

A key factor in predicting the vulnerability of military systems to a wide variety of EM threats involves understanding the phenomenology of how the energy penetrates through back door ports of entry (POE's). The first part of this report focuses on broadband (0.1 → 18 GHz) laboratories and measurement techniques being used in such studies. The emphasis is on coherent cw experiments because of the very great sensitivity, dynamic range, accuracy, flexibility, and data acquisition/processing capabilities of modern rf instrumentation systems. Experimental data are given for several slot/crack configurations in a metal wall; simple slots and covered slots in a thin wall, deep slots and grooved slots in a thick wall, and dielectrically loaded slots. Also included are comparisons of slotted-wall data with cavity-backed slotted-wall data. Limited comparisons are made with experimental and analysis/numerically modeled data. Attention is focused near and above the frequency ranges where the slots are resonant. Explanations of the associated coupling phenomenologies are given for each case.

48245 (UCRL—94446) **Summary of railgun development for ultrahigh-pressure research.** Hawke, R.S.; Nellis, W.J.; Newman, G.H.; Rego, J.; Susoeff, A.R. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 9p. (CONF-860703—9). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013021.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

This paper summarizes the results of EM launcher tests performed at Lawrence Livermore National Laboratory. The system used a helium gas injector and railgun launcher to accelerate and launch 1- and 4-g polycarbonate projectiles intact up to 6.6 and 3.0 km/s, respectively. A 625 kJ capacitor bank powered the railgun, and an adjustable inductor provided pulse shaping and peak current control. Operation in hard and soft vacuum was reliably achieved. Projectiles were accelerated without blowby and were verified by flash x-ray shadowgraphs to be intact after launch. A precision-bore launcher and projectiles with flared gas seals were used. Although

injection at 1 km/s significantly reduced erosion, it did not eliminate it. 5 refs., 12 figs., 4 tabs.

48246 **Remote controlled vacuum joint closure mechanism.** Doll, D.W.; Hager, E.R. (to Dept. of Energy, Washington, DC). US Patent 4,598,936. 8 Jul 1986. Filed date 22 Feb 1984. vp.

A remotely controlled noncircular vacuum joint closure mechanism is described including first and second flanges for establishing sealed connections with respective first and second members of an evacuated system, wherein each of the first and second members includes a respective mating flange. The closure mechanism consists of: a tubular member having first and second end portions and a noncircular cross-section, wherein the second end portion thereof is coupled to the second flange; an expansion joint coupling the first end portion of the tubular member to the first flange; displacement means mounted on the outside of the tubular member and engaging the first flange for extending the expansion joint and displacing the first flange toward or away from the mating flange of the first member in respectively establishing or removing sealed engagement therebetween; latch means mounted on the outside of the tubular member for securely engaging the mating flange of the first member in maintaining sealed engagement between the mating flange of the first member and the first flange; first remote control means coupled to the displacement means for moving the displacement means in a first direction in displacing the first flange toward the first member or for moving the displacement means in a second direction in displacing the first flange away from the first member; and second remote control means coupled to the latch means for positioning the latch means in a first position for locking the first flange in sealed engagement with the mating flange of the first member or for positioning the latch means in a second position for releasing the first flange from the mating flange of the first member.

48247 **Focusing corner cube.** Monjes, J.A. (to Dept. of Energy). US Patent Application 6-775,546. 12 Sep 1985. 13p. Contract W-7405-ENG-48. DE86013762 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013762.

This invention retortreflects and focuses a beam of light. The invention comprises a modified corner cube reflector wherein one reflective surface is planar, a second reflective surface is spherical, and the third reflective surface may be planar or convex cylindrical.

48248 **In situ repair of a failed compression fitting.** Wolbert, R.R.; Jandrasits, W.G. (to Dept. of Energy). US Patent Application 6-762,489. 5 Aug 1985. 14p. Contract AC11-76PN00014. DE86013682 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013682.

A method and apparatus for the in situ repair of a failed compression fitting is provided. Initially, a portion of a guide tube is inserted coaxially in the bore of the compression fitting and locked therein. A close fit dethreading device is then coaxially mounted on the guide tube to cut the threads from the fitting. Thereafter, the dethreading device and guide tube are removed and a new fitting is inserted onto the dethreaded fitting with the body of the new fitting overlaying the dethreaded portion. Finally, the main body of the new fitting is welded to the main body of the old fitting whereby a new threaded portion of the replacement fitting is precisely coaxial with the old threaded portion. If needed, a bushing is located on the dethreaded portion which is sized to fit snugly between the dethreaded portion and the new fitting. Preferably, the dethreading device includes a cutting tool which is moved incrementally in a radial direction whereby the threads are cut from the threaded portion of the failed fitting in increments.

48249 **Low voltage arc formation in railguns.** Hawke, R.S. (to Dept. of Energy). US Patent Application 6-762,649. 5 Aug 1985. 14p. Contract W-7405-ENG-48. DE86013683 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013683.

A low voltage plasma arc is first established across the rails behind the projectile by switching a low voltage high current source across the rails to establish a plasma arc by vaporizing a fuse mounted on the back of the projectile, maintaining the voltage across the rails below the railgun breakdown voltage to prevent arc formation ahead of the projectile. After the plasma arc has been formed behind the projectile a discriminator switches the full energy bank across the rails to accelerate the projectile. A gas gun injector may be utilized to inject a projectile into the breech of a railgun. The invention permits the use of a gas gun or gun powder injector and an evacuated barrel without the risk of spurious arc formation in front of the projectile.

48250 **Transformer current sensor for superconducting magnetic coils.** Shen, S.S.; Wilson, C.T. (to Dept. of Energy). US Patent Application 6-723,674. 16 Apr 1985. 16p. Contract AC05-84OR21400. DE86013804 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013804.

The present invention is a current transformer for operating currents larger than 2kA (two kiloamps) that is capable of detecting a millivolt level resistive voltage in the presence of a large inductive voltage. Specifically, the present invention includes substantially cylindrical primary turns arranged to carry a primary current and substantially cylindrical secondary turns arranged coaxially with and only partially within the primary turns, the secondary turns including an active winding and a dummy winding, the active and dummy windings being coaxial, longitudinally separated and arranged to mutually cancel voltages excited by commonly experienced magnetic fields, the active winding but not the dummy winding being arranged within the primary turns.

48251 **Results from uranium deposition studies for development of a limited frequency-unannounced access inspection strategy for gas centrifuge enrichment plants.** Cooley, J.N.; Fields, L.W.; Swindle, D.W. (Oak Ridge Gaseous Diffusion Plant, Oak Ridge, TN 37831). **14**: No. 3, 272-277(1985). (CONF-850765—).

From 26. annual meeting of the Institute of Nuclear Materials Management; Albuquerque, NM, USA (21 Jul 1985).

Uranium deposition studies were performed on a test loop system designed to simulate process gas flow through the header piping of a gas centrifuge enrichment plant. The objectives of these studies were to investigate the effectiveness of an in-line gaseous cleaning agent in removing uranium in pipe deposits and to analyze long-term deposition growth and isotopic exchange under simulated centrifuge plant operating conditions. The test loop studies are described, the results are reported, and the implications for analyzing actual plant data are discussed. Results indicate that (1) 93% of the uranium deposit is removed within 15 min when a pipe is pressurized with gaseous ClF_3, (2) the isotopic abundance of a highly enriched uranium deposit remains unchanged when UF_6 of a lower assay is introduced into the pipe, and (3) air inleakage will be the cause of the largest deposits in centrifuge plant process header pipes.

48252 **Drop and puncture testing of 1/4 scale model of NUPAC 125B rail cask.** Warrant, M.M.; Joseph, B.J.; Haelsig, R.T. (Sandia National Labs., Albuquerque, NM 87185). **14**: No. 3, 357-362(1985). (CONF-850765—). Contract AC04-76DP00789.

From 26. annual meeting of the Institute of Nuclear Materials Management; Albuquerque, NM, USA (21 Jul 1985).

Drop and puncture tests conducted on a 1/4 scale model of the NuPac 125B Fuel Shipping Cask are described and the correlation between test results and analytical predictions discussed. The NuPac 125B cask will be used to transport canisters of Three Mile Island Unit 2 (TMI-2) fuel debris, and provides two levels of testable containment for the canisters. The tests verified that the package can survive the impact hypothetical accident conditions specified in 10CFR71.73, provided experimental data on accelerations and strains, and defined the accident damage as initial conditions for other analyses. Three 30-ft. drop tests and two 40-in. drops onto a puncture bar were performed. The 30-ft. drop tests consisted of one end drop onto the bottom impact limiter, an oblique drop onto the closure-end impact limiter, and a flat drop onto the side of the package. The 40-in. puncture tests were directed at the side and closure end of the package. Additional test activities included measurement of critical package dimensions and leak testing.

4203 Lasers

REFER ALSO TO CITATION(S) 49463, 49576

48253 (AD-A—167613/9/XAB) Investigation of single-crystal silicates for blue tunable lasers. Quarterly progress report No. 1, 1 September-30 November 1985. Belt, R.F.; Catalano, J.A. (Litton Systems, Inc., Morris Plains, NJ (USA). Airtron Div.). Jan 1986. 37p. NTIS, PC A03/MF A01.

The single-crystal growth of rare earth silicates was investigated for the purpose of tunable-laser hosts. Silicates of the type R_2SiO_5, where R = La, Gd, Y, Lu, were prepared from stoichiometric melts and doped with Ce(3+) activators. Seed crystals were obtained from crystallized melt sections or by growth on an iridium wire. These seeds were utilized in standard Czochralski type growth to obtain larger single crystals. Cathodoluminescence experiments on both powders and single crystals showed wavelength shifts with different rare earth ions. The Gd, Y, and mixed crystals of Gd-Y silicates gave good bright emission with Ce(3+). The emission is broad band and covers the wavelength range of 370-525nm. The peak emission can be centered near 450-460nm by other compositions. Larger single crystals for laser hosts are under development.

48254 (AD-A—167937/2/XAB) Statistical model for laser safety analysis. Hermann, J.A. (Materials Research Labs., Ascot Vale (Australia)). Jan 1986. 25p. (MRL-R—983). NTIS, PC A02/MF A01.

A statistically-based model describing the effects of scintillations upon laser-beam propagation within the atmosphere has been investigated and has been applied to an analysis of laser safety.

48255 (AD-A—167983/6/XAB) Optoelectronic devices and related physical phenomena in thin-film semiconductor configurations. Final report. Lindsey, C.; Salzman, J.; Vahala, K.; Yariv. (California Inst. of Tech., Pasadena (USA). Dept. of Applied Physics). 1 May 1986. 28p. NTIS, PC A03/MF A01.

A research program in semiconductor lasers and related phenomena resulted in new understanding relating to coherent single lobe laser arrays and to structures displaying near-diffraction-limited output. Using their molecular beam epitaxial reactor, the authors demonstrated new unstable resonator geometry of semiconductor laser which potentially are capable of producing large-aperature high power without the need for arrays. Typical powers of approx. 0.4 Watt were demonstrated in a single mode. Basic theoretical analysis and experiments on noise in semiconductor lasers has resulted in a new quantum formulation that takes into account the amplitude to phase coupling. This coupling is characterized by a new dispersive parameter alpha. Direct measurement of alpha were performed.

48256 (DRET—83-1328-DS-SR) Elementary processes and modelling in metallic vapor lasers. Dubreuil, B. (Centre de Documentation de l'Armement (CEDOCAR), 75 - Paris (France). Direction des Recherches, Etudes et Techniques). Apr 1984. 143p. (In French). (PB—84-231539). NTIS (US Sales Only), PC E07/MF A01. File Number TI86752841.

After some recalls on principal mechanisms of collisional pumping existing in lasers excited by electric discharges, the different types of metal vapor lasers are described, are equally concerned in this description elementary mechanism physics and discharge cell technology. Then, in the particular case of the $He-Cd^+$ laser in positive column, the discharge has been modelized, in the typical conditions of the laser emission. An helium discharge model has been used which had been developed by the GREMI.

48257 (FRNC-TH—2224) Contribution to study of laser emission in semiconductors II-VI with wide forbidden band: ZnTe and MgZnTe. Roussel, C. (Institut National Polytechnique, 38 - Grenoble (France); Grenoble-1 Univ., 38 (France)). Oct 1984. 273p. (In French). NTIS (US Sales Only), PC A12/MF A01. File Number DE86752843.

By optical pumping and, overall, by pulsed electron bombardment, from a very specific facility, we show, analyze and characterize the laser emission of ZnTe and MgZnTe from 4°K to 300°K on Fabry-Perot cavities. We measure the optical gain and get very low laser threshold on good crystal quality cavities. We show that the laser emission kinetics depends on the excess rate in relation to the threshold on a classical model, a thermokinetic analysis accounts well for the different complex forms of spectra. On high purity crystals, the excitonic nature of different emission processes are precised at low excitation level (by photoluminescence), up to the ambient temperature; and, following the quantum models the emission under strong electron injection is attributed to inelastic collisions: exciton-exciton (for $T<60°K$) and exciton-free carriers (for $T>60°K$).

48258 (LA-UR—86-2542) Fundamental mechanisms of optical damage in short-wavelength high-power lasers. Haglund, R.F. Jr.; Tolk, N.H.; York, G.W. (Vanderbilt Univ., Nashville, TN (USA). Dept. of Physics and Astronomy; Los Alamos National Lab., NM (USA)). Oct 1985. Contract W-7405-ENG-36. 13p. (CONF-8510101—8). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013830.

From Boulder damage symposium; Boulder, CO, USA (15 Oct 1985).

Evidence has been accumulating for many years that the physical mechanisms responsible for damage to optical materials in and from high-power, short-wave-length lasers (SWLs) differ in fundamental ways from the thermal processes identified in infrared and visible-wavelength laser damage problems. We propose that this difference stems primarily from the electronic nature of the absorption and excitation processes which occur when SWL photons strike an optical surface, and that electrons, ions and uv photons generated in the laser excitation cycle also contribute to optical damage. In this paper, we present recent experimental results which have pinpointed specific electronic excitation mechanisms which can operate in the high-power laser environment. In many optical materials of interest for SWLs, the deposition of electronic energy creates self-trapped excitons which decay through the energetic expulsion of atoms and molecules from the surface of the material. This erosion process is accompanied by the creation of permanent electronic defects which become nucleation sites for further damage. The relationship between these microscopic mechanisms and observed macroscopic damage phenomenology is discussed, along with evidence for the existence of a surface overlayer which may point the way to radically new techniques for protecting SWL optical elements from laser damage.

48259 (N—86-22784, pp vp) Preliminary results toward injection locking of an incoherent laser array. Daher, J. Feb 1986. NTIS, PC A12/MF A01. (NASA-CR—176691).

In Telecommunications and Data Acquisition Report, Progress report, October-December 1985.

The preliminary results of phase locking an incoherent laser array to a master source in an attempt to achieve coherent operation are presented. The techniques necessary to demonstrate phase locking are described along with some topics for future consideration. As expected, the results obtained suggest that injection locking of an array, where the spacing between adjacent longitudinal modes of its elements is significantly larger than the locking bandwidth, may not be feasible.

48260 (NP—6770134) Alkyl substituted polyphenyls - laser dyes for the augmentation of the efficiency of dye lasers. Gerhardt, H. (Goettingen Univ. (Germany, F.R.)). 9 Feb 1984. 213p. (In German). NTIS (US Sales Only), PC A10/MF A01. File Number DE86770134.

In the present thesis the use of alkyl substituted polyphenyls for the augmentation of the efficiency in dye lasers is described. Therefore a large number of p-polyphenyls with 3 to 14 Benzole units were produced and their structure was determined by means of ^{13}C-NMR spectra. The use in lasers was investigated for pumping by flashlight and by excimer lasers. The photochemical properties of the polyphenyls were investigated by phosphorescence and T-T absorption spectra. (BHO).

48261 **Subpicosecond KrF excimer-laser source.** Schwarzenbach, A.P.; Luk, T.S.; McIntyre, I.A.; Johann, U.; McPherson, A.; Boyer, K.; Rhodes, C.K. (Department of Physics, University of Illinois at Chicago, P.O. Box 4348, Chicago, Illinois 60680). 11: No. 8, 499-501(Aug 1986).

A subpicosecond KrF* laser system capable of producing 20 +- 2-mJ pulses has been developed. The means of producing ultrashort seed pulses for the KrF/sup */ amplifier system and characteristics of the full system are described. It is shown that efficient subpicosecond energy extraction is possible.

48262 **Exploding conducting film laser pumping apparatus.** Ware, K.D.; Jones, C.R. (to Dept. of Energy, Washington, DC). US Patent 4,599,731. 8 Jul 1986. Filed date 27 Apr 1984. vp.

An apparatus is described for generating intense electromagnetic radiation for producing a population inversion in a gaseous medium suitable for laser oscillation and amplification. The apparatus consists of: a. an elongated electrically insulating substrate onto which is deposited a thin, electrically conducting film, the elongated substrate having a first end and a second end; b. means for providing a pulsed potential difference between the first end and the second end, whereby sufficient electrical current is passed through the electrically conducting film to cause it to vaporize producing thereby an electrical discharge in the gaseous medium, the discharge generating the intense electromagnetic radiation suitable for producing the population inversion suitable for laser oscillation and amplification therin; and c. means for supporting the laser oscillation arising from the population inversion and for extracting laser radiation produced therefrom, the means having an optical axis.

48263 **Apparatus and method for generating continuous wave 16 μM laser radiation using gaseous CF.** Telle, J.M. (to Dept. of Energy, Washington, DC). US Patent 4,599,726. 8 Jul 1986. Filed date 1 May 1984. vp.

An apparatus is described for generating cw 16 μm laser radiation in gaseous CF_4, which comprises in combination; a. a cw pump laser for generating coherent radiation in the 9 μm region of the infrared spectrum, the coherent 9 μm radiation having a wavelength appropriate for interacting with the CF_4 such that a relationship between pump power and CF_4 pressure results in a population inversion in the CF_4 suitable for producing cw laser oscillation therein; b. means for directing the coherent 9 μm radiation into the region of the CF_4 in order to permit the interaction therewith; c. means for maintaining the CF_4 gas at temperatures low enough to establish the population inversion suitable for sustaining the laser oscillation; and d. means for extracting the 16 μm cw laser radiation resulting from the laser oscillation.

48264 **Raman laser with controllable suppression of parasitics.** George, E.V. (to Dept. of Energy, Washington, DC). US Patent 4,599,725. 8 Jul 1986. Filed date 8 Mar 1983. vp.

An apparatus is described for producing a high intensity Raman laser pulse. The apparatus consists of: a Raman accumulator having first and second parallel side walls; a pump cell, spaced apart from the accumulator and containing a medium capable of producing a highly directional, substantially monochromatic radiation pulse of frequency ν/sub p/; a first mirror, positioned adjacent to the accumulator and substantially fully reflecting at frequencies ν/sub p/ and Θ/sub s/; a Stokes cell, adjacent to the pump cell and spaced apart from the accumulator; radiation source means, spaced apart from the accumulator, for producing a highly directional; a second mirror that is substantially fully reflecting for radiation at frequency ν_s/sub s/.

48265 **(AD-A—167846/5/XAB) Chinese Journal of Lasers (selected articles).** Gan; Zhang. Translated from 11: No. 8, 449-463(22 Apr 1986). 54p. (FTD-ID(RS)T—0004-86). NTIS, PC A04/MF A01.

Past and future research progress on laser crystals in China is reviewed. Some proposals are offered in order to open up a new prospect for the development of laser crystals. Various methods for measuring different kinds of physical properties of laser glasses were also investigated, and the corresponding apparatus was installed. Emphasis is placed on the inspection of optical quality of large-size glass products, and a laser holographic interferometer for optical-homogeneity measurement was developed. This paper also reports some fundamental research results on laser glasses. By using laser glass spectroscopy, the special properties and structural state of rare earth ions in inorganic glasses were investigated. The study of spectral and luminescent properties of Nd doped glasses was emphasized. Further detailed studies of the influence of the glass bases on spectral properties of Nd ions and the energy-transfer process of Nd ions in glasses were made.

48266 **Two-dimensional phase-locked semiconductor-laser array.** Chow, W.W. (to Dept. of the Air Force, Washington, DC). US Patent Application 6-840,620. 17 Mar 1986. 14p. NTIS, PC A02/MF A01.

A phase-locked two-dimensional semiconductor laser array is disclosed that emits a unified wavefront using columns of individual lasers, each laser having a slant mirror between it and the other lasers in its column. The individual lasers are all evanescently coupled to the neighboring lasers. The slant mirrors reflect the light from the lasers next to it upwards out of the face of the array. The phase locking is accomplishd by the evanescent wave coupling.

48267 **X-ray laser experiments research at the Nova Laser Facility.** Matthews, D.L. (Univ. of California, Lawrence Livermore National Lab., CA). pp vp of Proceedings of the international congress on applications of lasers and electro-optics. Toledo, OH; Laser Institute of America (1985). (CONF-8511103—).

From ICALEO international congress on the applications of lasers and electro-optics; San Francisco, CA, USA (11 Nov 1985).

The author reviews the lasing phenomena and its applications at soft x-ray wavelengths. Included is a description of soft x-ray laser demonstration experiments at 20.6, 20.9 and 15.5 nm for optical laser pumped collisional excitation laser schemes, physics understanding of the phenomena, the new 10TW 2-beam facility at the Nova laser and near-term experiment's program. Ultimately, the authors are hoping to achieve efficient lasing at 3 to 5 nm at MW output power levels, with low-divergence highly-coherent beam properties. Near term their research will be performed at 20 to 15 nm wavelengths and will focus on achieving saturated output from the ASE amplifier and characterizing the beams divergence and mode structure.

48268 **Real-time, low-cost laser diagnostic system.** Ramos, T.J.; Lingenfelter, A.C. (Lawrence Livermore National Lab., Livermore, CA). pp vp of Proceedings of the international congress on applications of lasers and electro-optics. Toledo, OH; Laser Institute of America (1985). (CONF-8511103—).

From ICALEO international congress on the applications of lasers and electro-optics; San Francisco, CA, USA (11 Nov 1985).

The ability to make precision parts in laser metalworking operations demands a high degree of control over laser characteristics. Also, assurance of repeatable results from weld to weld requires diagnostic instrumentation and real-time availability to the laser operator of beam energy information. For optimal use of laser equipment, a diagnostic system should allow verification of such characteristics as beam mode and stability and permit their on-line adjustment, as needed. Ability to document and retrieve information on these characteristics as part of the fabrication qualification record, or for future reference, is another desired feature. The diagnostic system developed for laser metalworking requirements at LLNL has four major subsystems: (1) a standard model of a commercially available personal computer, (2) a frame grabber, (3) a TV camera, and (4) system control software. The computer requires sufficient capacity to process approximately 262K bytes of information per frame. Therefore, they use a 10 megabyte hard-disc drive plus a single floppy disc drive.

48269 **Recent progress in high repetition rate high power, line-narrowed alexandrite laser.** Sam, R.C.; Rapoport, R.; Matthews, S. (Military Laser Products, Allied Technologies Co., 31717 La Tienda Dr., Westlake Village, CA). pp 28-37 of Tunable solid state lasers. Hammerling, P.; Budgor, A.B.; Pinto, A. New York, NY; Springer-Verlag New York, Inc. (1985). (CONF-8406188—).

From Conference on tunable solid state lasers; La Jolla, CA, USA (13 Jun 1984).

This paper describes the specifications, conceptual design and development of a high repetition rate, high average power, line-narrowed, tunable alexandrite laser system. A brief description of the development of support hardware, experimental data obtained, difficulties encountered, and design modifications to resolve these problems is given. Also included is an update on current system performance.

48270 **Alexandrite laser systems: Scaling to kilowatt powers.** Johnannsen, D.C. pp 38-41 of Tunable solid state lasers. Hammerling, P.; Budgor, A.B.; Pinto, A. New York, NY; Springer-Verlag New York, Inc. (1985). (CONF-8406188—).

From Conference on tunable solid state lasers; La Jolla, CA, USA (13 Jun 1984).

With alexandrite laser systems producing tens of watts now developed, it is interesting to consider how powerful a system could be developed through the scaling up of existing designs. The most logical starting point for such a scaling is the 150 W system, which Allied is developing under contract to the Department of Energy (DOE), which is currently the most powerful alexandrite system in preparation. In this paper the author discusses how an optimization of parameters for maximum power production coupled with larger alexandrite elements might allow scaling to kilowatt power.

48271 **Trivalent cerium doped crystals as tunable laser systems: Two bad apples.** Hamilton, D.S. (Dept. of Physics and Inst. of Materials Science, Univ. of Connecticut, Storrs, CT). pp 80-90 of Tunable solid state lasers. Hammerling, P.; Budgor, A.B.; Pinto, A. New York, NY; Springer-Verlag New York, Inc. (1985). (CONF-8406188—).

From Conference on tunable solid state lasers; La Jolla, CA, USA (13 Jun 1984).

The 5d-4f transitions of trivalent doped crystals have broad emission bands with large oscillator strengths and near unity quantum efficiency. These characteristics make cerium systems strong candidates for tunable solid state lasers. However, two such cerium crystals will probably never lase. The first is Ce^{3+}:YAG where a strong excited state absorption quenches the lasing transition. Recent measurements have indicated that the excited state absorption terminates in the YAG conduction band with a peak cross-section of 1.0×10^{-17} cm^2 at 700 nm. Some of the general features of impurity ion to band spectra are discussed. The second system is Ce^{3+}:CaF_2 where a UV pump-induced photochromic center is produced following excitation of the cerium ions. The initial measurements of cerium-related transient absorptions in Ce^{3+}:YLF are also presented.

48272 **Theoretical methods for the study of transition metals in crystals.** Winter, N.W. ; Pitzer, R.M. (Lawrence Livermore National Lab., Livermore, CA). pp 164-171 of Tunable solid state lasers. Hammerling, P.; Budgor, A.B.; Pinto, A. New York, NY; Springer-Verlag New York, Inc. (1985). (CONF-8406188—). Contract W-7405-ENG-48.

From Conference on tunable solid state lasers; La Jolla, CA, USA (13 Jun 1984).

The characterization of the electronic structure of impurities in solids impacts a large class of phenomena and devices. It is particularly important for the systematic development of new solid state laser media. The large number of ion-host combinations that must be studied in order to optimize the linear and non-linear optical properties and the thermal and mechanical properties of the laser preclude a case-by-case experimental investigation. This suggests that an aggressive theoretical effort to determine the optical properties of these materials will be useful in the search for new tunable solid state lasers.

48273 **New harmonic materials: index engineering.** Eimerl, D. (Lawrence Livermore National Lab., CA). 555-556(Nov 1984). Contract W-7405-ENG-48.

The goal of advanced nonlinear materials research is to develop the capability of matching material parameters to a particular desired application. Index engineering is a method of adjusting the refractive indices of a material to obtain non-critical phase-matching over a range of wavelengths. The index is adjusted either by doping the crystal or by making solid solutions of structurally similar crystals. Thus, the lattice constants and the UV absorption edge are affected, changing both the birefringence and the wavelength dispersion. By an adroit choice of materials, some decoupling between the changes in the birefringence and the dispersion can be arranged. This paper describes its application to the KDP series of homologs.

48274 **Thin-thick quadrature frequency conversion.** Eimerl, D. (Lawrence Livermore National Lab., CA). 557-559(Nov 1984). Contract W-7405-ENG-48.

The quadrature conversion scheme is a method of generating the second harmonic. The scheme, which uses two crystals in series, has several advantages over single-crystal or other two crystal schemes. The most important is that it is capable of high conversion efficiency over a large dynamic range of drive intensity and detuning angle.

48275 **Electro-optical switches with plasma electrodes.** Goldhar, J.; Henesian, M.A. (Lawrence Livermore National Lab., CA). 9: No. 3, 73-75(Mar 1984). Contract W-7405-ENG-48.

A transparent electrode concept using low-pressure ionized gas in the glow discharge regime is proposed for large-aperture electro-optic switch applications. A longitudinal Pockels cell and an electro-optically tuned second-harmonic-generation cell using KDP have successfully demonstrated the concept. 4 references, 4 figures.

4204 Heat Transfer And Fluid Flow

REFER ALSO TO CITATION(S) 47227, 47238, 47654, 47657, 47684, 47686, 47687, 47726, 47735, 47893, 48081, 49466

48276 **(AD-A—167874/7/XAB) Analysis of the performance of a vertically oriented, gas-loaded, variable-conductance heat pipe. Master's thesis.** Glover, G.A. (Naval Postgraduate School, Monterey, CA (USA)). Mar 1986. 54p. NTIS, PC A04/MF A01.

An analysis of steady-state operation of a vertically oriented, variable-conductance heat pipe is presented. The effects of binary mass diffusion, axial pipe wall conduction, and gravitational effects, caused by the difference in molecular weight of the non-condensible gas and the working fluid are incorporated. Analytical expressions for the conservation of mass, momentum, and energy are combined along with equations of state to describe steady-state operation of the heat pipe. These expressions are combined to form a system of three differential equations with three unknowns; working-fluid vapor velocity, mass fraction, and temperature. These equations are nondimensionalized, and an iteration scheme for numerical solution of the equations is presented.

48277 **(AEEW-R—1928) Experimental investigation of untriggered film boiling collapse.** Naylor, P. (UKAEA Atomic Energy Establishment, Winfrith). Mar 1985. 43p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703163.

Film boiling has been investigated in a stagnant pool, using polished brass or anodised aluminium alloy rods in water. Experimental boiling curves were obtained, and pronounced ripples on the vapour/liquid interface were photographed. A criterion for untriggered film boiling collapse is proposed, consistent with experimental results. Application of the results to molten fuel coolant interaction studies is discussed.

48278 **(AEEW-R—1929) Experimental investigation of triggered film boiling destabilisation.** Naylor, P. (UKAEA Atomic Energy Establishment, Winfrith). Mar 1985. 31p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703164.

Film boiling was established on a polished brass rod in water, collapse being initiated by either a pressure pulse or a transient bulk water flow. This work is relevant to the triggering stage

of a molten fuel-coolant interaction, and a criterion is proposed for triggered film boiling collapse with pressure pulse.

48279 **(AEEW-R—1930) Theoretical model of steady state film boiling and its comparison with experimental results.** Naylor, P. (UKAEA Atomic Energy Establishment, Winfrith). Mar 1985. 52p. NTIS (US Sales Only), PC A04/MF A01. File Number DE86703165.

The model described here is for a vertical cylindrical heater with a hemispherical lower end. It was developed as part of an experimental investigation of untriggered and triggered film boiling collapse and the validity of the assumptions is assessed for the range of experimental conditions. Comparison is made with theoretical results.

48280 **(AERE-R—11930) Data acquisition software system for velocity and turbulence measurements on the two dimensional channel flow rig.** Gillespie, R.; Martin, S.R. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Physics and Metallurgy Div.). Sep 1985. 35p. H.M. Stationery Office, London, price Pound 5.00.

A software system is described for two component velocity measurements on a turbulent water flow. The software runs on a PDP11/73 with RT11 version 5 and TSX. Signals from a two component laser doppler system in a ribbed flow channel were collected by photomultipliers and fed to two Dantec 55N21 frequency trackers via 55N12 frequency shift units. Digital data output from the trackers was sent to a PDP11/73 computer via a Dantec 57G20 buffer interface and a DEC DRV11 interface board. Software was written to collect data through this interface at rates up to 150k words per second. Data processing software was included to give two velocity components and their cross correlations. This allowed the calculation of the Reynolds stresses as well as the velocities for comparison with theoretical models. Other data processing routines allowed spectral analysis of the data. Means of dealing with signal dropouts are discussed. The use of the software is also described.

48281 **(EGG-J—01586) Heat transfer in gas tungsten arc welding.** Smartt, H.B.; Stewart, J.A.; Einerson, C.J. (EG and G Idaho, Inc., Idaho Falls (USA)). May 1986. Contract AC07-76ID01570. 14p. (CONF-8510160—19). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013457.

From ASM metals congress/TMS-AIME fall meeting; Toronto, Ontario, Canada (13 Oct 1985).

The heat transferred from an electrode negative, argon gas tungsten arc to an anode has been measured for a wide range of conditions suitable for mechanized welding applications. The results are given as (1) the arc efficiency; and (2) the anode heat and current input distribution functional shapes and radii for various anode materials and groove shapes over a wide range of current and voltage, using different electrode geometries, as well as both He and Ar-He shielding gases. The nominal arc is Gaussian with a diameter of about 4 mm and a heat transfer efficiency to the anode of about 75%. Variations from these values are discussed in terms of current knowledge of the electrical and thermal energy transport mechanisms. A new method of measuring the heat transferred from the arc to the anode, using a boiling liquid nitrogen calorimeter, has been developed which gives rapid, accurate values.

48282 **(N—86-25728) Construction and use of divergence free vector expansions for incompressible fluid flow calculations. Final Report.** Mhuiris, N.M.G. (National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center). Apr 1986. 22p. (NASA-CR—178100). NTIS, PC A02/MF A01.

For incompressible fluids the law of mass conservation reduces to a constraint on the velocity vector, namely that it be divergence free. This constraint has long been a source of great difficulty to the numericist seeking to discretize the Navier-Stokes and Euler equations. A spectral method is discussed which overcomes this difficulty. Its efficacy is demonstrated on some simple problems. The velocity is approximated by a finite sum of divergence free vectors, each of which satisfies the same boundary conditions as the velocity. Projecting the governing equation onto the space of inviscid vector fields eliminates the pressure term and produces a set of ordinary differential equations that must be solved for the coefficents in the velocity. The pressure can then be recovered if it is needed.

48283 **(SAND—84-1563) Space Marching Inverse Conduction Code.** Hills, R.G.; Hensel, E.C. (New Mexico State Univ., Las Cruces (USA). Dept. of Mechanical Engineering). Jul 1986. Contract AC04-76DP00789. 128p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86014079.

This document describes the Space Marching Inverse Conduction Code. This code models the one dimensional inverse heat conduction problem using a space marching finite difference technique. In addition to providing surface condition estimates, the code also provides estimates for the resolving power and accuracy of the estimates. The program also has the ability to handle simple phase change problems. 35 refs., 35 figs.

48284 **(UCID—20680) PLUS family: a set of computer programs to evaluate analytical solutions of the diffusion equation.** Montan, D.N. (Lawrence Livermore National Lab., CA (USA)). Feb 1986. Contract W-7405-ENG-48. 149p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86014098.

This report is intended to describe, document and provide instructions for the use of a set of computer programs commonly referred to as the PLUS family. These programs were designed to numerically evaluate simple analytic solutions of the diffusion equation. The original member of the family, a program called PLUS, was written to provide calculational support for a study of the storage of nuclear waste in geological media. Originally, PLUS computed temperture changes at points in space and time due to a finite length line source. The need to handle arrays of sources led to modifications. To this end, PLUS was changed to subroutine status and new programs were written: CELERY, to control the I/O chores; STALKS, with storage space for an arbitrary array of sources; MIDNITE, to produce thermal contours in and/or about the array. The newest members of the family, TWIGS, and DAYLITE were created to do some of the things (uniform arrays of identical sources) that STALKS and MIDNITE could do but without the need for additional storage space. The original design of these programs was for thermal calculations, however, diffusion equation is used in the study of a number of other field, for example, fluid flow in porous media (hydrology, petroleum reservoirs), and the PLUS family may find other possible homes. 9 refs., 13 figs.

48285 **(UCID—20824) TOPAZ2D: a two-dimensional finite element code for heat transfer analysis, electrostatics, and magnetostatics problems.** Shapiro, A.B. (Lawrence Livermore National Lab., CA (USA). Mechanical Engineering Dept.). Jul 1986. Contract W-7405-ENG-48. 109p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014749.

TOPAZ2D is a two-dimensional implicit finite element computer code for heat transfer analysis, electrostatics, and magnetostatics problems. This report provides a user's manual for TOPAZ2D and a description of the numerical algorithms used. Sample problems with analytical solutions are presented. TOPAZ2D has been implemented on the CRAY and VAX computers.

48286 **Nearly-implicit hydrodynamic numerical scheme for two-phase flows.** Trapp, J.A.; Riemke, R.A. (Department of Mechanical Engineering, University of Colorado, Denver, Colorado 80202). *Journal of Computational Physics;* 66: No. 1, 62-82(Sep 1986).

This article presents an extension of the semi-implicit numerical scheme for two-phase flow simulation. The extension uses an implicit evaluation of the convective fluxes and thus eliminates the material Courant stability restriction. The new algorithm involves a two-step approach for the mass and energy equations and a single fully-implicit step for the momentum evaluations. Some analysis and accuracy considerations for the scheme are also presented.

48287 **Time-of-flight characterization of pulsed supersonic helium free-jet expansions.** Kay, B.D.; Raymond, T.D.; Rice, J.K. (Sandia National Laboratories, Albuquerque, New Mexico 87185). **57**: No. 9, 2266-2273(Sep 1986). Contract AC04-76DP00789.

A synchronous time-of-flight (TOF) technique is employed to make velocity distribution measurements in pulsed supersonic free-jet expansions. For helium expansions, the flow attains a steady—state condition with a terminal Mach number of 80, on a 50-μs time scale. The transient behavior is primarily due to the mechanical action of the valve. For a 650-μs-wide pulse, greater than 95% of the atoms issuing from the pulsed nozzle can be described by the steady-state parameters. However, the velocity dispersion increases at both the leading and trailing edges of the pulse. This dispersion can be quantitatively described by incorporating a time-dependent Mach number into the standard steady-state flux velocity distribution function.

48288 **Acoustic cross-correlation flowmeter for solid-gas flow.** Sheen, S.-H.; Raptis, A.C. (to Dept. of Energy, Washington, DC). US Patent 4,598,593. 8 Jul 1986. Filed date 14 May 1984. vp.

This patent describes an apparatus for measuring particle velocity in a solid-gas flow within a pipe having a wall made of a material capable of propagating an ultrasonic signal therein consisting of: first and second transmitting transducers positioned at first and second locations, respectively, along the pipe the first and second transmitting transducers being directly connected to the wall of the pipe to develop first and second ultrasonic signals in the pipe wall the first and second ultrasonic signals being modulated by noise from particle impingement; an acoustic coupler, positioned between the first and second transmitting transducers, for acoustically isolating the first and second modulated ultrasonic signals from one another; first and second detecting transducers directly connected to the wall of the pipe for detecting the first and second modulated ultrasonic signals respectively and for generating first and second output signals respectively in response to the first and second detected modulated ultrasonic signals; and means for cross-correlating the first and second output signals.

48289 **Viscous resuspension.** Leighton, D.; Acrivos, A. (Stanford Univ., CA). *Chemical Engineering Science;* **41**: No. 6, 1377-1384(1986).

The resuspension of a settled layer of particles in a shear flow, typically associated with turbulence, has also been found to occur under viscous conditions (Gadala-Maria, F.A., 1979, Ph.D. Thesis, Stanford University). In this work the authors demonstrate that viscous resuspension, characterized by the equilibrium height achieved by an initially settled bed of particles expanding in the presence of an applied shear stress, results from a balance between the downward flux of particles due to gravity and an upward flux arising from shear-induced particle diffusion. Predictions of this equilibrium height using independent measurements of the shear-induced diffusion coefficient are shown to be in approximate agreement with experimental observations.

4205 Materials Testing

REFER ALSO TO CITATION(S) 47925, 47932

48290 **(CONF-860856—1) Multiparameter methods with pulsed eddy currents.** Dodd, C.V.; Deeds, W.E. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014224.

From Conference on review of progress in quantitative NDE; San Diego, CA, USA (3 Aug 1986).

Multiparameter methods have been used for a number of years to distinguish certain material properties from others that may be varying in the same eddy-current inspection. Usually the measured data are the magnitudes and phases of the eddy currents at several fixed frequencies. Alternatively, the necessary data can be obtained from pulsed eddy currents by measuring the pulse heights at various times or the times to reach various pulse heights. Such data can be used to analyze the pulse into various Fourier components, but that is time consuming and unnecessary. The raw data (for example, the pulse heights at various times) can be used as variables in polynomial approximations to the various properties in exactly the same way has been used with the multifrequency, multiparameter method. This approach has several advantages, including simpler equipment, ability to use higher frequencies, and less modification required for different inspection problems.

48291 **(EGG-M—06485) Comparison of experimental results for surface-flawed specimens versus predictions based on COD design curve.** Reuter, W.G.; Epstein, J.S. (EG and G Idaho, Inc., Idaho Falls (USA)). 1985. Contract AC07-76ID01570. 12p. (CONF-8505295—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013464.

From Fitness for purpose in welded construction meeting; Philadelphia, PA, USA (13 May 1985).

The purpose of this paper is to compare experimental results, obtained from surface flawed specimens, with predictions based on the COD design curve. The comparison is based on conditions for initiation of crack growth.

48292 **(SAND—86-0046) Nondestructive testing at Sandia National Laboratories, Albuquerque.** Thompson, K.R.; Costley, R.D. (eds.). (Sandia National Labs., Albuquerque, NM (USA). Nondestructive Testing Technology Div.). Apr 1986. Contract AC04-76DP00789. 19p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014792.

The NDT divisions, Nondestructive Testing (7551) and Nondestructive Testing Technology (7552), analyze material properties, locate and characterize flaws within materials, monitor the internal operation of complex mechanisms, and determine the integrity of bonds between materials. The techniques listed in Contents are applied. This manual describes each technique and facility and directs potential users to the appropriate personnel for further information.

48293 **(UCRL—15715) Design of an acousto-optic goniometric specimens mount. Report No. 2 on modeling of acoustic microscopes.** Evans, G.E.; Rice, D.L.; Schwartz, M. (Houston Univ., TX (USA). Dept. of Mechanical Engineering). 1 May 1985. Contract W-7405-ENG-48. 122p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86013902.

The proposed project is to design, build, and test an acousto-optic goniometric specimen mount. It will be used in a related experiment, evaluating reflection of sound from the surfaces of various specimens. The desired specimen mount is one which will utilize as much of the existing testing apparatus as possible. The mount must provide a means of scanning the sound beam with a laser.

48294 **(UCRL—93185) Nanosecond two-dimensional imaging using tomographic techniques.** Koehler, H.A.; Jacoby, B.A. (Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 20p. (CONF-860950—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86008164.

From 17. international congress on high speed photography and photonics; Pretoria, South Africa (1 Sep 1986).

Several fast, single transient data imaging systems have been developed for time-resolved imaging of pulsed radiation sources. Both MCP intensified solid-state, two-dimensional framing cameras and streak cameras/solid-state camera systems are used. The streak camera system yields small, two-dimensional images with limited spatial resolution ($\leq$150 spatial points) and $\leq$0.5 nsec exposure. It is those streak camera systems developed at Lawrence Livermore National Laboratory that are used for obtaining time-resolved, tomographically reconstructed, two-dimensional images of electron and x-ray beams.

48295 **(UCRL—94282) Sensitivity of uniaxial failure on spatial variations of initial geometry, initial microcrack density, and time dependent material properties.** Stout, R.B. (Lawrence Livermore National Lab., CA (USA)). Jun 1986. Contract W-7405-ENG-48. 12p. (CONF-860894—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014437.

From 4. international RILEM symposium on creep and shrinkage of concrete: mathematical modeling; Evanston, IL, USA (26 Aug 1986).

A model for the non-uniform creation of microcracks during uniaxial tensile testing has been discussed. The model describes failure due to microcrack creation kinetics. Future extensions of the model to represent microcrack growth and coalescence are necessary in order to compare with experimental data that indicates a decrease of microcrack number density during failure. Also, a more complete mathematical treatment for multi-species of microcracks and their interactions is required.

48296 **(Y/DW—642) Analytic signal converter for nondestructive testing.** Duncan, M.G. (Oak Ridge Y-12 Plant, TN (USA)). 1986. Contract AC05-84OS21400. 9p. (CONF-8603139—1). NTIS, PC A02/MF A01. File Number DE86012720.

From Southeastcon '86: IEEE region 3 conference and exhibit; Richmond, VA, USA (23 Mar 1986).

An analytic signal converter was developed to improve flaw detection in parts. The converter can resolve echoes 700 ns apart. The converter oprerates in real-time by using a single-sideband conversion technique, Weaver's Method. The transducer range is 1 to 40 MHz.

4206 Safety Engineering

REFER ALSO TO CITATION(S) 49639

48297 **(LA-UR—86-2396) Methods for air cleaning system design and accident analysis.** Gregory, W.S.; Nichols, B.D. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 7p. (CONF-860820—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013841.

From 19. DOE/NRC nuclear air cleaning conference; Seattle, WA, USA (17 Aug 1986).

This paper describes methods, in the form of a handbook and five computer codes, that can be used for air cleaning system design and accident analysis. Four of the codes were developed primarily at the Los Alamos National Laboratory, and one was developed in France. Tools such as these are used to design ventilation systems in the mining industry but do not seem to be commonly used in the nuclear industry. For example, the Nuclear Air Cleaning Handbook is an excellent design reference, but it fails to include information on computer codes that can be used to aid in the design process. These computer codes allow the analyst to use the handbook information to form all the elements of a complete system design. Because these analysis methods are in the form of computer codes, they allow the analyst to investigate many alternative designs. In addition, the effects of many accident scenarios on the operation of the air cleaning system can be evaluated. These tools originally were intended for accident analysis, but they have been used mostly as design tools by several architect-engineering firms. The Cray, VAX, and personal computer versions of the codes, an accident analysis handbook, and the codes' availability will be discussed. The application of these codes to several design operations of nuclear facilities will be illustrated, and their use to analyze the effect of several accident scenarios also will be described.

48298 **The status of personnel identity verifiers.** Maxwell, R.L. (Sandia National Labs., Albuquerque, NM). **14**: No. 3, 461-465(1985). (CONF-850765—).

From 26. annual meeting of the Institute of Nuclear Materials Management; Albuquerque, NM, USA (21 Jul 1985).

Identity verification devices based on the interrogation of six different human biometric features or actions now exist and in general have been in development for about ten years. The capability of these devices to meet the cost and operational requirements of speed, accuracy, ease of use and reliability has generally increased although the verifier industry is still immature. Sandia Laboratories makes a continuing effort to stay abreast of identity verifier developments and to assess the capabilities and improvements of each device. Operating environment and procedures more typical of field use can often reveal performance results substantially different from laboratory tests. An evaluation of several recently available verifiers is herein reported.

4208 Electronic Circuits And Devices

REFER ALSO TO CITATION(S) 47747, 48055, 48249, 48604, 48622, 49512

48299 **(BDX—613-3510) Automation of printed wiring assembly manufacturing. Final report.** Douglass, R.C. (Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.). Jul 1986. Contract AC04-76DP00613. 38p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014654.

A Robotic Component Preparation (RCP) workcell was designed, developed, and implemented into the production system. The RCP system was initially released for tinning and binning all axial leaded components but is capable with further development for use on radial leaded parts as well. A technique was developed to produce printed wiring assemblies while still in the multi-image printed wiring board panel that complements the component insertion and machine soldering processes with a measurable gain in productivity. Feasibility studies were conducted into the use of automated systems for solder joint and component insertion verification. A plan for incorporating a Factory Management System that offers material and information control was developed. The Factory Management System utilizes bar codes and carousel storage systems for material control and a Shop Floor Information System (SFIS) for information management.

48300 (CONF-860102—Summs., pp TE-5.1-TE-5.3) **Programmable automated transistor test system.** Truong, L.V.; Sundberg, G.R. (NASA Lewis Research Center, Cleveland, OH). 1986. NTIS, PC A13/MF A01. File Number DE86005726.

From 3. symposium on space nuclear power systems; Albuquerque, NM, USA (13 Jan 1986).

The paper describes a programmable automated transistor test system (PATTS) and its utilization to evaluate bipolar transistors and Darlingtons, and such MOSFET and special types as can be accommodated with the PATTS base-drive. An application of a pulsed power technique at low duty cycles in a non-destructive test is used to examine the dynamic switching characteristic curves of power transistors. Data collection, manipulation, storage, and output are operator interactive but are guided and controlled by the system software. In addition a library of test data is established on disks, tapes, and hard copies for future reference.

48301 **(CONF-860755—1) Implementation of FORPS on a NOVIX Beta Board.** Matheus, C.J. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013403.

From 4. Rochester conference; Rochester, NY, USA (11 Jul 1986).

FORPS is a Forth-based Production System developed for fast, real time control problems. It employs a very small and efficient inference engine to cycle through sets of IF-THEN production rules. The original version of FORPS was written in polyFORTH for a 68000 microcomputer. Recently, FORPS has been ported to the NOVIX Beta Board running NOVIX FORTH. Topics discussed are the FORPS production system, including rule definitions, dictionary entry, the rule table, the inference engine, and the translation to the NOVIX board. The translation from polyFORTH to novix FORTH resulted in a relative speedup of greater than 28:1 for the Towers of Hanoi artificial intelligence problem. (DWL) 4 refs., 4 figs., 1 tab.

48302 **(IAEA-TECDOC—363) Selected topics in nuclear electronics.** (International Atomic Energy Agency, Vienna (Austria)). Jan 1986. 203p. NTIS (US Sales Only), PC A10/MF A01. File Number DE86703195.

The IAEA training courses in the field of nuclear electronics heavily rely upon practical work in the laboratory. Accordingly, the IAEA has produced and published the Nuclear Electronics Laboratory Manual (TECDOC 309) where the experience on organizing the efficient practical training in nuclear electronics was compiled. The present publication is focused on the theoretical understanding of basic electronic circuits and is of particular importance to the attendees of the IAEA training course. The present

publication does not copy any available book on nuclear electronics and instrumentation. On purpose, it does not describe the elementary electronics circuits as applied in nuclear instruments; they can be found in books. It starts the nuclear electronics study on the instruments level, continues to describe the technology and circuitries on the board level, and only in some exceptional cases investigates the circuits on the components level. It is believed that such an approach better reflects the advanced status of nuclear electronics and the philosophy of the modern design of nuclear instruments. For illustration, and wherever it appeared useful, some commercial instruments are described and analyzed. figs and tabs.

48303 (INIS-mf—10173, pp 62) **UA2 100 Mhz Flash-ADC electronics.** Iacopini, E. Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48304 **(LA-UR—86-2372) Energy storage transformer power conditioning systems for Megajoule class flux compression generators.** Reinovsky, R.E.; Colclaser, R.G.; Welby, J.M.; Lopez, E.A. (Los Alamos National Lab., NM (USA); Air Force Weapons Lab., Kirtland AFB, NM (USA); Maxwell Labs., Inc., Albuquerque, NM (USA)). 1986. Contract W-7405-ENG-36. 9p. (CONF-860703—23). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013850.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

Circuit and energy storage transformer configurations are developed to match high impedance loads to low impedance sources. With the secondary open, a large di/dt is produced in the primary circuit by inserting a resistance, characteristic of an opening switch, and the load circuit is connected using a preset spark gap. Transformer design concepts using a foil-MYLAR "sandwich" for the secondary winding are described, permitting close primary-secondary coupling. Transformer experiments driven by a 0.25 MJ capacitor bank support the overall system concepts. A compact flux compression generator-transformer system is described.

48305 **(LA-UR—86-2379) Results from plasma compression opening switch experiments.** Goforth, J.H.; Greene, A.E. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 8p. (CONF-860703—19). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013847.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

During the past three decades, a wide variety of explosive-driven magnetic-flux compression generators (explosive generators) has been developed. As the explosive-pulsed power field has expanded, more refined techniques for coupling explosive generator outputs to specialized loads have been sought. In many instances, the most efficient way to deliver current rapidly to a load from an explosive generator powered circuit is to make use of inductive storage techniques. Such techniques, however, require opening switches with appropriate characteristics for both the specific generator and the load to be coupled. For use with explosive plate generators, an adaptation of the plasma compression switches described by Pavlovskii et al has been developed and tested both with static and dynamic loads. The new plasma compression switch geometry is well suited for coupling explosive plate generators to low inductance loads requiring pulse risetimes of ≤ 1 μs and currents up to 4 to 5 MA. We discuss here the design, operating characterisitics and limits of this planar plasma compression switch. For use with coaxial explosive generators (or for load pulses much in excess of 5 MA) the cylindrical geometry described originally by Pavlovskii seems preferable. Based on our own limited experience with cylindrical geometry and currently available data, we project a maximum practical size and operating limits for such switches. 14 refs.

48306 **(LA-UR—86-2387) Design of a fast-plate generator driving plasma flow switch.** Caird, R.S.; Goforth, J.H.; Turchi, P.J. (Los Alamos National Lab., NM (USA); R and D Associates, Alexandria, VA (USA)). 1986. Contract W-7405-ENG-36. 22p. (CONF-860703—24). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013843.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

Over the last fifteen years, there has been continuing interest in the use of magnetic flux compression generators to drive plasma implosion loads. Studies of fast plate-type generators coupled to cylindrical foil-plasma discharges in z-pinch geometry indicated that operation in the few microsecond time regime (generator time $\approx$ implosion time) might be successful. Later experiments and two-dimensional MHD calculations demonstrated that penetration of the effects of cold, nonmoving boundaries into the plasma implosion, combined with Rayleigh-Taylor instability, prevents practical attainment of microsecond implosions of cylindrical plasmas (a few cm or less in axial extent). Use of longer plasmas and/or shorter implosion times, however, implies higher effective driving voltages and shorter current risetimes at the load. Since explosively-driven plate generators may already represent the limit of generator performance in terms of speed, it is therefore necessary to include an intermediate stage of power conditioning between microsecond generators and submicrosecond implosion loads. The present paper discusses coupling the plasma flow switch to a fast plate generator in order to accumulate magnetic energy in vacuum on a few microsecond timescale and then release this energy rapidly to a submicrosecond implosion load.

48307 **(LA-UR—86-2412) Magnetic flux compression generator powered electron beam experiments.** Freeman, B.L.; Erickson, D.J.; Fowler, C.M.; Hoeberling, R.F.; King, J.C.; Kruse, P.J.; Peratt, A.L.; Rickel, D.G.; Thode, L.E.; Toevs, J.W. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 10p. (CONF-860703—20). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013839.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

We have combined several technologies in a rather conservative fashion to perform feasibility experiments to power a vacuum, electron beam diode with an explosive power supply. The magnetic flux-compression generator used in these experiments was the 13.2-cm-wide by 52.8-cm-long plate generator. The output of this device was switched into an air-core, foil-wound, step-up transformer with a turn ratio of 30:1. The transformer and diode were connected through a 9-m-long piece of Sieverts high-voltage cable. The diode structure consisted of a high-voltage terminal on a stacked-ring grading structure with a 5-cm-diameter stalk to support a 12.7-cm-diameter field emission cathode. The cathode-anode gap was 2.5 cm, and the anode was 6.35-micron--thick aluminized mylar. Currents of $\geq$14 kA and voltages of $\geq$540 kV were achieved with a pulse length of $\geq$100 ns. Theoretical predictions agree with experimental performance until the diode shorted. However, this event limited the ultimate performance of the experiments. We consider diode shorting to be a major problem to be dealt with in future experiments involving >1 μs power pulses. This approach to powering electron beams should prove useful for experiments requiring only a few events or for very high-energy diode design and scaling tests. 11 figs.

48308 **(SAND—85-8025) Automated data acquisition system for multiple thermal cycling tests.** Condreva, K.J. (Sandia National Labs., Livermore, CA (USA). Electronic Subsystems Div.). Jul 1986. Contract AC04-76DR00789. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014745.

This report describes a 64-channel data acquisition system which was developed to simultaneously monitor up to 7 electronic component assemblies that are undergoing thermal cycling as part of their production acceptance testing. The 64 channels are scanned sequentially with a sampling time of 15 μsec/channel. This results in a 66.7-kHz scan rate, or a 1.04-kHz sample rate for each data

channel. Since saving all of the data acquired in a test would require a prohibitive amount of memory, the data are compressed to a set of data values once every 15 minutes, plus anomalies. The system can store up to 2 megabytes of data in nonvolatile disc memory.

48309 **(SAND—86-0845C) Performance of polysilicon gate CMOS devices in space and SDI environments.** Schwank, J.R.; Sexton, F.W.; Winokur, P.S.; Fleetwood, D.M.; Dressendorfer, P.V. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1986. Contract AC04-76DP00789. 3p. (CONF-860966—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86009025.

From Space electronics conference; Albuquerque, NM, USA (9 Sep 1986).

The purpose of this work is to investigate the radiation response of state-of-the-art hardened polysilicon gate CMOS devices in space and SDI environments. To simulate the different radiation evnironments both very high and very low dose rate sources will be used. The results will be examined from the basic mechanisms involved which will be correlated to device functionality. In addition, we also will examine the radiation responses of devices exposed to large, short duration pulses after having been previously irradiated at much lower dose rates.

48310 **(SAND—86-1600C) Consensus on powering and grounding sensitive electronic equipment.** Key, T.S.; Martzloff, F.D. (Sandia National Labs., Albuquerque, NM (USA); National Bureau of Standards, Washington, DC (USA)). 1986. Contract AC04-76DP00789. 20p. (CONF-860903—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013350.

From IEEE-Industry Applications Society annual meeting; Denver, CO, USA (28 Sep 1986).

As sensitive electronic processing systems proliferate in our facilities so do power-related problems. Efforts to alleviate these problems have ranged from installing expensive power conditioning equipment to applying special grounding techniques not found in conventional safe grounding practice. Understanding of what is actually going on has been lacking. We find elaborate power systems, modified from basic practice to the extent of being unsafe, that continue to be plagued with powering- and grounding-related problems. Out of this chaos we are persuaded to study and understand the complexities of the problem and to begin developing good practices. This is the objective of the IEEE Working Group on Powering and Grounding Sensitive Electronic Equipment, Standards Project P1100. We will introduce Project P1100, preview its scope and technical content and, most importantly, invite participation in this seriously needed consensus standard activity.

48311 **(UCID—20788) Microstrip antenna modeling and measurement at high frequencies.** Bevensee, R.M. (Lawrence Livermore National Lab., CA (USA)). 30 Apr 1986. Contract W-7405-ENG-48. 15p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014404.

This report addresses the task C(i) of the Proposal for Microstrip Antenna Modeling and Measurement at High Frequencies by the writer, July 1985. The task is: Assess the advantages and disadvantages of the three computational approaches outlined in the Proposal, including any difficulties to be resolved and an estimate of the time required to implement each approach. The three approaches are (1) Finite Difference, (2) Sommerfeld-GTD-MOM, and (3) Surface Intergral Equations - MOM. These are discussed in turn.

48312 **(UCRL—94855) Comparison of numerical helical generator simulations with experimental results.** Abe, D.K.; Chase, J.B. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 8p. (CONF-860703—29). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014447.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

We have made comparisons between the experimental results on small helical flux compression generators, described elsewhere at this conference, and computer simulations. A 2D hydrodynamic computer simulation was used to generate the acceleration profile of the armature of the generators. The electrical behavior of the generators was predicted using the CIRC computer code. Various generator loss models were examined, including resistive and flux trapping models. A discussion of the comparisons will be given.

48313 **(UCRL—94856) CIRC: a specialized circuit analysis computer simulation program for a high explosive generator model.** Chase, J.B. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 9p. (CONF-860703—27). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014448.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

CIRC is a fast computer model for the simulation of the performance of a high explosive helical magnetic flux compression generator and a load. These separate models are joined by a lumped circuit solved by CIRC as a multinode network equation with time as the independent variable. In this paper the generator model, as it currently exists, will be detailed. It is the "generator equation" that is numerically integrated by CIRC. The units used in CIRC are time in microseconds, mass in grams, distance in centimeters, current in 10^7 amperes, voltage in 10^4 volts, inductance in nanohenries, resistance in milli-ohms and magnetic field strength in megagauss.

48314 **Equilibrium properties of thin-oxide metal-oxide-semiconductor diodes.** Butler, M.A.; Seager, C.H. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **60**: No. 6, 2137-2141(15 Sep 1986). Contract AC04-76DP00789.

The zero-bias resistance and high frequency capacitance of Al- and Pd-gated thin-oxide metal-oxide-semiconductor diodes have been measured as a function of temperature. The temperature dependence of the semiconductor barrier height is found to be large, primarily due to inversion effects. The relatively low activation energies observed for the zero-bias resistance, as well as actual measurements of spatial variations in device current, strongly suggest the presence of large variations in the semiconductor band bending. These variations may be directly related to thickness nonuniformities which are known to occur in SiO_2 films processed at low temperatures.

48315 **P-italic-channel, strained quantum well, field-effect transistor.** Drummond, T.J.; Zipperian, T.E.; Fritz, I.J.; Schirber, J.E.; Plut, T.A. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Applied Physics Letters;* **49**: No. 8, 461-463(25 Aug 1986). Contract AC04-76DP00789.

A p-italic-channel field-effect transistor with a 3.5 μm Cr/Au gate was fabricated from a modulation-doped GaAs/In/sub 0.2/Ga/sub 0.8/As/GaAs quantum well structure. Well-behaved transistor action was observed at both 300 and 77 K with extrinsic transconductances of 6.2 and 11.3 mS/mm, respectively. Shubnikov—deHaas measurements prove the existence of a two-dimensional hole gas with a strain-shifted light-hole ground state associated with a light-hole mass of 0.154m-italic$_0$.

48316 **Theory of response of radiation sensing field-effect transistors in zero-bias operation.** Hughes, R.C. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **60**: No. 3, 1216-1217(1 Aug 1986). Contract AC04-76DP00789.

Radiation sensing field-effect transistors operated at zero bias show a low-dose response that is roughly linear in the thickness of the gate oxide. The same devices show a thickness squared dependence if a bias is applied during the irradiation. This effect can be explained by examining the effect of diffusion and electron trapping on the buildup of net positive charge in the gate oxide.

48317 **Low frequency AC waveform generator.** Bilharz, O.W. (to Dept. of Energy, Washington, DC). US Patent 4,599,703. 8 Jul 1986. Filed date 22 Nov 1983. vp.

A circuit is described for synthesizing the sine of an angle from a first signal representative of the angle comprising: input means receiving the first signal; absolute value determination means connected to the input means for producing a second signal having a voltage equal to the absolute value of the voltage of the first signal; exponential circuit means responsive to the second signal for producing a third signal having a voltage related to the voltage of the second signal by a predetermined power; multiplication circuit means responsive to the first and third signals for producing a fourth signal having a voltage proportional to the product of the voltages of the first and third signals; and summer circuit means responsive to the first and fourth signals for subtracting the voltage of the fourth signal from the voltage of the first signal to produce an output signal having a voltage indicative of the sine of the voltage of the first signal.

48318 **Reusable fast opening switch.** VanDevender, J.P.; Emin, D. (to Dept. of Energy, Washington, DC). US Patent 4,598,338. 1 Jul 1986. Filed date 21 Dec 1983. vp.

A reusable fast opening switch is described for pulse power applications comprising: a pair of spaced, plate, conductors; a bulk magnetic semiconductor disposed between the conductors, the magnetic semiconductor being highly conductive below a critical temperature (T/sub C/) and rapidly transforming into an insulator above T/sub C/ by undergoing at least an order of magnitude change in resistivity for a temperature change 10°C: and shock absorber means for protecting the semiconductor from shock waves generated during a resistivity transition.

48319 **Means of manufacturing annular arrays.** Day, R.A. (to Dept. of Energy). US Patent Application 6-786,384. 10 Oct 1985. 15p. Contract AT03-78SF70030. DE86013657 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013657.

A method is described for manufacturing an annular acoustic transducer array from a plate of transducer material, which enables production of precision aligned arrays at low cost. The circular plate is sawed along at least two lines that are radial to the axis of the plate. At steps along each radial cut, the plate is rotated first in one direction and then in an opposite direction by a predetermined angle such as slightly less than 90°. The cuts result in the forming of several largely ring-shaped lands, each largely ring-shaped land being joined to the other rings of different radii by thin portions of the plate, and each ring being cut into segments. The bridges that join different rings hold the transducer together until it can be mounted on a lens.

48320 **Piezoelectric shear wave resonator and method of making same.** Wang, J.S.; Lakin, K.M.; Landin, A.R. (to Dept. of Energy). US Patent Application 6-736,164. 20 May 1985. 36p. Contract W-7405-ENG-82. DE86013722 NTIS, PC A03/MF A01; GPO Dep. File Number DE86013722.

An acoustic shear wave resonator comprising a piezoelectric film having its C-axis substantially inclined from the film normal such that the shear wave coupling coefficient significantly exceeds the longitudinal wave coupling coefficient, whereby the film is capable of shear wave resonance, and means for exciting said film to resonate. The film is prepared by deposition in a dc planar magnetron sputtering system to which a supplemental electric field is applied. The resonator structure may also include a semiconductor material having a positive temperature coefficient of resonance such that the resonator has a temperature coefficient of resonance approaching 0 ppM/°C.

4209 Waste Processing Plants And Equipment

48321 **(DOE/CE/40568—T1) Applied fields for energy conservation, water treatment, and industrial applications. Final report.** Reimers, R.S.; Bock, S.F.; White, L.E. (Tulane Univ., New Orleans, LA (USA). Dept. of Environmental Health Sciences). Jun 1986. Contract FG01-82CE40568. 387p. NTIS, PC A17/MF A01. File Number DE86014306.

A detailed evaluation was performed on the use of applied fields (nonionizing radiations, ultrasound, magnetic fields, etc.) for industrial waste treatment, wastewater treatment, and disinfection. Other industrial uses of applied fields and biological considerations were also studied. The evaluation was conducted in the following phases: literature review and personal contacts, papers from field and laboratory professionals, and a workshop with contributed papers. (DLC)

4210 Combustion Systems

REFER ALSO TO CITATION(S) 47872, 48213

48322 **(N—86-23856) Dilution jet mixing program, supplementary report.** Srinivasan, R.; White, C. (Garrett Turbine Engine Co., Phoenix, AZ (USA)). Mar 1986. 397p. (NASA-CR—175043; REPT—21-4705). NTIS, PC A17/MF A01.

The velocity and temperature distributions predicted by a 3-D numerical model and experimental measurements are compared. Empirical correlations for the jet velocity trajectory developed are presented. The measured velocity distributions for all test cases of phase through phase 3 are presented in the form of contour and oblique plots. Quantification of the effects of the following on the jet mixing characteristics with a confined crossflow are: (1) orifice geometry, momentum flux ratio, and density ratio; (2) nonuniform mainstream temperature and velocity profiles upstream of dilution orifices; (3) cold versus hot jet injection; (4) cross-stream flows converge as encountered in practical dilution zone geometries; (5) 2-D slot versus circular orifices; (6) discrete noncirculcer orifices; (7) single-sided versus opposed jets; (8) single row of jets.

48323 **(N—86-24931) Burner liner thermal/structural load modeling: TRANCITS program user's manual.** Maffeo, R. (General Electric Co., Cincinnati, OH (USA)). Aug 1985. 45p. (NASA-CR—174891). NTIS, PC A03/MF A01.

Transfer Analysis Code to Interface Thermal/Structural Problems (TRANCITS) is discussed. The TRANCITS code satisfies all the objectives for transferring thermal data between heat transfer and structural models of combustor liners and it can be used as a generic thermal translator between heat transfer and stress models of any component, regardless of the geometry. The TRANCITS can accurately and efficiently convert the temperature distributions predicted by the heat transfer programs to those required by the stress codes. It can be used for both linear and nonlinear structural codes and can produce nodal temperatures, elemental centroid temperatures, or elemental Gauss point temperatures. The thermal output of both the MARC and SINDA heat transfer codes can be interfaced directly with TRANCITS, and it will automatically produce stress model codes formatted for NASTRAN and MARC. Any thermal program and structural program can be interfaced by using the neutral input and output forms supported by TRANCITS.

48324 **(UCRL—93040) Chemical kinetic analysis of pulse combustors.** Westbrook, C.K.; Keller, J.O. (Lawrence Livermore National Lab., CA (USA); Sandia National Labs., Albuquerque, NM (USA)). Apr 1986. Contract W-7405-ENG-48. 21p. (CONF-860904—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86009895.

From International gas research conference; Toronto, Canada (8 Sep 1986).

A detailed numerical model is used to study the role of chemical kinetics in the operation of pulse combustors. The contributions of kinetic factors are shown to influence the composition limits, although the existence of a rich limit in some pulse combustors under near-stoichiometric conditions is shown to be determined by mixing limitations. The effects of changes in fuel composition and dilution by inert additives including carbon monoxide and molecular nitrogen on the operation of the pulse combustor are interpreted through their influence on the kinetics of the reignition process. 12 refs., 3 figs.

4220 Underground Engineering

48325 (SAND—86-1084C) Downhole radar system for fracture detection. Chang, H.T. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 6p. (CONF-860926—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86009854.

From Geothermal Resources Council annual meeting; Palm Springs, CA, USA (29 Sep 1986).

A borehole radar prototype was designed based on theoretical considerations. Experiments were conducted at a granite quarry where an existing flame-cut slot was used to simulate a fracture. The radar returns from this simulated fracture were detectable in boreholes located at distances of up to 12 meters from the fracture. Engineering design for a downhole radar system is almost complete. This system, including the directional antennas, is fabricated into a tool to be used in a borehole.

4240 Pollution Control Equipment

48326 (NP—6770139) Carbonate stone in acid media of wet flue gas desulfurization. Stumpf, T. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen). 11 Jul 1985. 133p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86770139.

The reaction behaviour of carbonate stone dust is an influence asset during the operation of flue gas desulphurization systems. For separating the various influence parameters method of measurement has been developed, which is suitable for an operational use too. This method of measurement makes it possible to determine the reactivity of carbonate stone dust in acid solutions with high reproductivity possible. Under practice-adhered conditions important qualities of the raw material are comprehended and the influences on the reactivity are estimated. (orig./PW).

4250 Power Cycles

REFER ALSO TO CITATION(S) 47861

48327 (ANL-CT—86-1) Reversing Flow Test Facility. Technical report, March 1986. Roach, P.D. (Argonne National Lab., IL (USA)). Apr 1986. Contract W-31-109-ENG-38. 76p. NTIS, PC A05/MF A01; GPO Dep. File Number DE86014615.

The Reversing Flow Test Facility (RFTF) is intended for the study of fluid flow and heat transfer under the reversing-flow conditions that occur in Stirling engines. the facility consists of four major parts: (1) Mechanical Drive - two cylinders with cam-driven pistons which generate the reversing gas flow, (2) Test Section - a U-shaped section containing instrumented test pieces, (3) Instruments -l high-speed transducers for measuring gas pressure and temperature, piston positions, and other system parameters, and (4) Data Acquisition System - a computer-based system able to acquire, store, display and analyze the data from the instruments. The RFTF can operate at pressures up to 8.0 MPa, hot-side temperatures to 800°C, and flow-reversal frequencies to 50 Hz. Operation to data has used helium as the working gas at pressures of 3.0 and 6.0 MPa, at ambient temperature, and at frequencies from 1 to 50 Hz. The results show that both frictional and inertial parts of the pressure drop are significant in the heater, coolers and connecting tubes; the inertial part is negligible in the regenerators. In all cases, the frictional part of the pressure drop is nearly in phase with the mass flow. 18 refs., 22 figs., 13 tabs.

48328 (DOE/NASA—1005-9) Overview of the 1986 free-piston Stirling SP-100 activities at the NASA Lewis Research Center. Slaby, J.G. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1986. Contract AI05-82OR21005. 19p. (NASA-TM—87305; CONF-860810—20). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010333.

From Intersociety energy conversion engineering conference; San Diego, CA, USA (25 Aug 1986).

An overview of the National Aeronautics and Space Administration (NASA) Lewis Research Center SP-100 free-piston Stirling engine activities is presented. These activities include a free-piston Stirling space-power technology feasibility demonstration project as part of the SP-100 program being conducted in support of the Department of Defense (DOD), Department of Energy (DOE), and NASA. The space-power Stirling advanced technology effort, under SP-100, addresses the status of the 25 kWe Space Power Demonstrator Engine (SPDE) including test results. Future space-power projections are presented along with a description of a study that will investigate the feasibility of scaling a single-cylinder free-piston Stirling space-power module to the 150 kW power range. Design parameters and conceptual design features will be presented for a 25 kWe, single-cylinder free-piston Stirling space-power converter. A description of a hydrodynamic gas bearing concept will be presented whereby the displacer of a 1 kWe free-piston Stirling engine is modified to demonstrate the bearing concept. And finally the goals of a conceptual design for a 25 kWe Solar Advanced Stirling Conversion System capable of delivering electric power to an electric utility grid will be discussed. The solar work is under an interagency agreement between DOE/Sandia National Laboratory and NASA Lewis.

43 PARTICLE ACCELERATORS

48329 (CONF-850504—Pt.1) IEEE Transactions on Nuclear Science. 1985 particle accelerator conference: accelerator engineering and technology. Volume NS-32, No. 5, Part 1. Shea, R.F. (ed.). (Institute of Electrical and Electronics Engineers, Inc., New York (USA)). 1985. Contract FG02-85ER40238. 99p. Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piocataway, NJ 08854-4150. File Number TI86014309.

From Particle accelerator conference; Vancouver, Canada (13 May 1985).

Separate abstracts were prepared for 346 papers in the first part of these conference proceedings. Topics covered in this part include high-energy accelerators and colliders, particle sources, electrostatic accelerators, controls, instrumentation, and feedback, beam dynamics, low-energy and intermediate-energy circular accelerators and rings. (LEW)

4301 Design, Development, And Operation

REFER ALSO TO CITATION(S) 47274, 49150

48330 (ANL—85-22, pp 161) Superconducting LINAC: prototype heavy-ion superconducting LINAC. Benaroya, R.; Bogaty, J.M.; Bolinger, L.M.; Pardo, R.C.; Shepard, K.W.; Zinkann, G.P.; Aron, J.; Clifft, B.E.; Markovich, P.; Nixon, J.M.; Waterson, M.F. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

This project, started in mid-1975 and now completed, has been concerned with the design, construction, installation, and testing of a small superconducting linear accelerator (LINAC) to serve as an energy booster for heavy-ion beams for the FN tandem accelerator. The principal objectives of the project have been to develop a new accelerator technology and to build the prototype for a heavy-ion booster that can be used to upgrade the performance of any tandem accelerator. The overall design is highly modular in character in order to provide maximum flexibility for future modifications and/or improvements. The 24-resonator system was completed in 1982.

48331 (ANL—85-22, pp 162-163) Superconducting LINAC: the ATLAS project. Benaroya, R.; Bogaty, J.M.; Bollinger, L.M.; Pardo, R.C.; Shepard, K.W.; Zinkann, G.P.; Aron, J.; Clifft, B.E.; Markovich, P.; Nixon, J.M.; Waterson, M.F. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The Argonne Tandem-Linac Accelerator System (ATLAS) is a heavy-ion accelerator being formed by enlarging the booster linac and by adding a large new target area. The resulting system, consisting of the existing tandem and a 7-section linac, will have a performance that is approximately equivalent to that of a 50-MV tandem with two strippers. The accelerator layout is illustrated and developments during the reporting period are described.

48332 (ANL—85-22, pp 165-168) **Investigations of superconducting-linac technology: superconducting accelerating structures.** Shepard, K.W.; Zinkann, G.P.; Markovich, P. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The development of superconducting accelerating structures for heavy ions is continuing on a broad front. This work includes (1) the completion of development of a $\beta = 0.16$ resonator for use in ATLAS, (2) the development of a quarter-wave resonator made of niobium, and (3) a program to develop new superconducting structures for the acceleration of very slow ions. During 1985, most of the effort is being devoted to the low-β structures.

48333 (ANL—85-22, pp 174-191) **Operation of the tandem-linac accelerator.** Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The tandem-linac accelerator system is operated as a source of energetic heavy-ion projectiles for research in several areas of nuclear physics and occasionally in other areas of science. The accelerator system consists of a 9-MV tandem electrostatic accelerator and a superconducting-linac energy booster that can provide an additional 20 MV of acceleration. A figure shows the layout of this system, which will be operated in its present form until September 1985, when it will be incorporated into the larger ATLAS system. In both the present and future forms the accelerator is designed to provide the exceptional beam quality and overall versatility required for precision nuclear-structure research.

48334 (ANL—85-22, pp 192-200) **Operation of the Dynamitron facility.** Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The Physics Division operates a high-current 4.5-MV Dynamitron accelerator which has unique capability as a source of ionized beams of most atoms and many molecules. A layout of the Dynamitron is shown. Operation, university research and future development of the accelerator are discussed.

48335 (BNL—34518-Ed.3) **AGS experiments: 1984, 1985, 1986. Third edition.** Depken, J.C. (Brookhaven National Lab., Upton, NY (USA)). Feb 1986. Contract AC02-76CH00016. 100p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86013378.

Brief summaries are given of 44 different experiments either running or scheduled to run at the Brookhaven National Laboratory Alternating Gradient Synchrotron, as well as the experiment schedules. The beam parameters and fluxes are tabulated. Illustrations are given of both the experimental area layouts and the apparatus for each experiment. (LEW)

48336 (DOE/SF/00515—T65) **Stanford Linear Accelerator Center monthly report for June 1986.** (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). 1986. Contract AC03-76SF00515. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014120.

Operational activities for the month of June 1986 are reported in the areas of accelerator and research operations, research area and experiment status, accelerator improvements, research division developments, PEP division developments, and publications for the month. (LEW)

48337 (LA—10655-C, pp 5-33) **Status of LAMPF.** Rosen, L. Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

The status of the last year are reviewed. Topics covered include some major research advances, eg. muon decay, major facilities additions and operational milestones. Also discussed are the politics of LAMPF II and management issues.

48338 (LA—10655-C, pp 34-36) **Future directions.** Garvey, G.T. Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

Present capabilities and future advances at LAMPF are briefly described. In the near term TOFI, the sophisticated magnetic spectrometer, will soon be on line for neutrino oscillation experiments and in the longer term the Nucleon Physic Laboratory will allow new nucleon-nucleon and nucleon-nucleus physics. LAMPF II will provide significant capability for investigations of deconfinement and the Standard Model.

48339 (LA—10655-C, pp 37-40) **Operation's report 1985 users meeting.** Hagerman, D.C. Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

The past year has been extremely busy at LAMPF with the first half being devoted to a shutdown for major changes in the facility and the second half being devoted to production under the challenging conditions imposed by three-beam operation.

48340 (LA—10655-C, pp 124-130) **Japanese medium energy program.** Yamazaki, T. (Univ. of Tokyo, Japan). Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

Most of the present research activities on medium energy nuclear and particle physics in Japan are based on the proton synchrotron facilities at KEK (National Laboratory for High Energy Physics). The KEK PS complex consists of a 500 MeV rapid cycling booster synchrotron of 20 Hz repetition and a 12 GeV main ring. The design concept underlying was to facilitate parasitic use of the 500 MeV beam while accelerating protons to 12 GeV in the main ring, because the main ring requires only a quarter (9 pulses) of the booster beam in a cycle of 2.14 sec. After the successful operation of the KEK PS in 1975, three parasite projects using the booster beam were established. (i) A pulsed neutron scattering facility (KENS) for condensed matter research, (ii) a pulsed meson facility for meson science (BOOM), and (iii) a medical project using protons and neutrons. The author will talk about the meson science project at the booster synchrotron as well as various nuclear/particle programs at the 12 GeV PS, and at the end the author will mention future plans.

48341 (LAL-RT—85-03) **Super e^+e^- linear collider in Europe: why not.** Le Duff, J. (Paris-11 Univ., 91 - Orsay (France). Lab. de l'Accelerateur Lineaire). Mar 1985. 12p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86750863.

Since it is hard to imagine that future very high energy machines could be duplicated, it is then worthwhile considering the case of a super e^+e^- linear collider in Europe. In this note we shall mainly consider the CERN site as a possible location for an e^+e^- linear collider of 8 km total length, following a LEP diameter, for instance between two opposite experimental halls. Performance expectations are presented and power consumption is considered.

48342 (LBL—21536) **Future accelerator technology.** Sessler, A.M. (Lawrence Berkeley Lab., CA (USA)). May 1986. Contract AC03-76SF00098. 10p. (CONF-860575—17). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013190.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

A general discussion is presented of the acceleration of particles. Upon this foundation is built a categorization scheme into which all accelerators can be placed. Special attention is devoted to

accelerators which employ a wake-field mechanism and a restricting theorem is examined. It is shown how the theorem may be circumvented. Comments are made on various acceleration schemes.

48343 **(LBL—21673) Relativistic heavy ion facilities: worldwide.** Schroeder, L.S. (Lawrence Berkeley Lab., CA (USA)). May 1986. Contract AC03-76SF00098. 24p. (CONF-860575—16). NTIS, PC AA02/MF A01; 1; GPO Dep. File Number DE86013009.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

A review of relativistic heavy ion facilities which exist, are in a construction phase, or are on the drawing boards as proposals is presented. These facilities span the energy range from fixed target machines in the 1 to 2 GeV/nucleon regime, up to heavy ion colliders of 100 GeV/nucleon on 100 GeV/nucleon. In addition to specifying the general features of such machines, an outline of the central physics themes to be carried out at these facilities is given, along with a sampling of the detectors which will be used to extract the physics. 22 refs., 17 figs., 3 tabs.

48344 **(SAND—86-1722C) Radial transmission line linear accelerators.** Prestwich, K.R. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 42p. (CONF-860756—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013565.

From NATO advanced study institutes program conference; Pitlochry, Scotland (13 Jul 1986).

Very-high-current linear accelerators are discussed which can be built with either radial or coaxial filled with high dielectric strength liquids. These cavities function as pulse-forming transmission lines and as a means to supply energy to the beam. Cavity design considerations are discussed, particularly with respect to radial cavities and externally fed cavities. RADLAC I and LIU-10, two high-current electron beam accelerators operating with radial transmission, are described. Also described is RADLAC II, a 16 MV, 50 kA accelerator, which has been implemented using water dielectric strip transmission lines to supply energy to the beam. (LEW)

48345 **(SLAC-PUB—3936) SLAC low emittance accelerator test facility.** Loew, G.A.; Miller, R.H.; Sinclair, C.K. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 4p. (CONF-860629—31). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013435.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

SLAC is proposing to build a new Accelerator Test Facility (ATF) capable of producing a 50 MeV electron beam with an extremely low geometric tranverse emittance (1.5×10^{-10} rad.m) for the purpose of testing new methods of acceleration. The low emittance will be achieved by assembling a linear accelerator using one standard SLAC three-meter section and a 400 kV electron gun with a very small photocathode (40 microns in diameter). The photocathode will be illuminated from the back by short bursts (on the order of 6 ps) of visible laser light which will produce bunches of about 10^{8} electrons. Higher currents could be obtained by illuminating the cathode from the front. The gun will be mounted directly against the accelerator section. Calculations show that in the absence of an rf buncher, injection of these 400 keV small radius electron bunches roughly 30^{0} ahead of crest produces negligible transverse emittance growth due to radial rf forces. Acceleration of the electrons up to 50 MeV followed by collimation, energy slits and focusing will provide a 3.2 mm long waist of under 1.5 μm in diameter where laser acceleration and other techniques can be tested.

48346 **(SLAC-PUB—3981) Unified formulation for linear accelerator design.** Farkas, Z.D. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 7p. (CONF-860629—25). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013441.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

Expressions for peak and average powers required to produce a given average gradient in an accelerator section are given. They are valid for both lossy and lossless (superconducting) sections, for both traveling wave and standing wave sections, and for pulsed or continuous wave rf input. The expressions are given in terms of structure parameters that are equally applicable to traveling wave or standing wave. These parameters delineate the effect of wall losses and energy required to build up the field. For both traveling wave and standing wave sections it is possible to make the rf pulse length short enough to make the wall losses negligible at the expense of increased peak power requirement. Therefore the expressions will include the effects of pulse compreasion. 6 refs., 7 figs.

48347 **(SLAC-PUB—3985) Future $e^{+}e^{-}$ linear colliders and beam-beam effects.** Wilson, P.B. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 6p. (CONF-860629—38). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014648.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

Numerous concepts, ranging from conventional to highly exotic, hae been proposed for the acceleration of electrons and positrons to very high energies. For any such concept to be viable, it must be possible to produce from it a set of consistent parameters for one of these "benchmark" machines. Attention is directed to the choice of parameters for a collider in the 300 GeV energy range, operating at a gradient on the order of 200 MV/m, using X-band power sources to drive a conventional disk-loaded accelerating structure. These rf power sources, while not completely conventional represent a reasonable extrapolation from present technology. The choice of linac parameters is strongly coupled to various beam-beam effects which take place when the electron and positron bunches collide. We summarize these beam-beam effects, and then return to the rf design of a 650 GeV center-of-mass collider. 14 refs.

48348 **(SLAC-PUB—4013) Beam optical design and studies of the SLC arcs.** Kheifets, S.; Fieguth, T.; Brown, K.L.; Chao, A.; Murray, J.J.; Servranckx, R.V.; Wiedemann, H. (Stanford Linear Accelerator Center, Menlo Park, CA (USA); Lawrence Berkeley Lab., CA (USA); Saskatchewan Univ., Saskatoon (Canada); Stanford Univ., CA (USA). Dept. of Applied Physics). Jun 1986. Contract AC03-76SF00515. 6p. (CONF-860870—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014471.

From 13. international conference on high energy accelerators; Novosibirsk, USSR (7 Aug 1986).

The first- and second-order optics for the Stanford Linear Collider (SLC) Arcs are designed to preserve the small transverse beam emittance while transporting electrons and positrons of +- 0.5% energy spread from the linac to the Interaction Point. This paper describes the repetitive and special sections lattices, the orbit correction scheme to compensate field and alignment errors, and the results of the studies of the Arc optical properties. The effects on the bream of quantum emission, chromatic distortions and higher-order aberrations are discussed. Utilization of various computer programs for Arcs studies is described briefly. Relevance of this work to future linear colliders is pointed out.

48349 **Short review of Monte Carlo hadronic cascade calculations in the multi-TeV energy region.** Mokhov, N.V.; Cossairt, J.D. (Fermi National Accelerator Lab., Batavia, IL, USA). **244**: No. 3, 349-355(1 Apr 1986).

Studies of a number of design problems of high energy proton accelerators are often carried out using Monte Carlo simulations of hadronic and electromagnetic cascades. This paper reviews results obtained using three computer programs which are compatible with the design problems of multi-TeV accelerators. Comparisons of the results obtained using these codes are made with each other and, where possible, with existing experimental data. Rather good agreement is typically found.

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REFER ALSO TO CITATION(S) 48347, 48348

48350 (AD-A—167631/1/XAB) Acceleration of ions and electrons by wave-particle interactions. Annual summary report, 1 April-30 November 1985. Wu, C.S.; Gaffey, J.D. (Maryland Univ., College Park (USA). Inst. for Physical Science and Technology). 30 Nov 1985. 10p. NTIS, PC A02/MF A01.

The research program is divided into four tasks. 1. Application of kinetic cross-field streaming instabilities to laboratory experiments. 2. Electromagnetic electron-cyclotron instability excited by hot electrons with a loss-cone distribution. 3. Induced emission of electromagnetic radiation near the second harmonic of the plasma frequency 4. Effects of an electrostatic instability on the induced emission of electromagnetic radiation near 2 omega sub e.

48351 (AD-A—167863/0/XAB) Acceleration of ions and electrons by wave-particle interactions. Final report for 1 April 1984-31 March 1985. Wu, C.S.; Gaffey, J.D. (Maryland Univ., College Park (USA). Inst. for Physical Science and Technology). 31 Mar 1985. 15p. NTIS, PC A02/MF A01.

This program studied instabilities resulting from energetic ion beams streaming across a magnetic field, or other nonequilibrium features, such as temperature anisotropy or a loss-cone distribution function, and calculating the emission of radiation at the fundamental and harmonics of the cyclotron frequency and at the second harmonic of the plasma frequency. The program has five tasks. 1. Effect of electron thermal anisotropy on the kinetic cross-field streaming instability. 2. Applications of kinetic cross-field streaming instabilities to laboratory experiments. 3. Electromagnetic electron-cyclotron instability excited by energetic electrons with a loss-cone distribution. 4. Induced emission of electromagnetic radiation near the second harmonic of the plasma frequency. Calculation of spontaneous cyclotron emissivity using the complete relativistic resonance condition.

48352 (ANL—85-22, pp 115) **Acceleration of silver beams with the Linac accelerator.** Rehm, K.E.; Hartog, P.D.; Henning, W.; Kutschera, W.; Pardo, R. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

With the new ATLAS accelerator particles up to mass = 140 can be accelerated to energies which surpass the Coulomb barrier of the heaviest elements. In order to detect possible problems in the acceleration and identification of particles in this mass range, ^{107}Ag and ^{109}Ag beams were accelerated to 350 MeV in the present Linac accelerator. It was observed that the 90° analyzing magnet could not clearly separate contributions from different charge state combinations, originating from the double stripping process. This problem could be solved through the use of an additional high energy chopper. The Ag particles were detected in the magnetic spectrograph; 10 charge states were measured simultaneously. From the measured mass resolution, $\Delta m = 1$ for 3 MeV/nucleon Ag-particles, one can expect that single isotope separation is feasible at the higher ATLAS energies in this mass range.

48353 (CONF-860575—35) Possibility of achieving a condensed crystalline state in cooled particle beams. Schiffer, J.P.; Rahman, A. (Argonne National Lab., IL (USA); Minnesota Univ., Minneapolis (USA)). 1986. Contract W-31-109-ENG-38. 3p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014584.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

Calculations have shown that when a plasma of one kind of particle (one-component plasma or OCP) is below a certain temperature, it will undergo a phase transition and the particles will form a crystalline (bcc) array. The relevant parameter is $\Gamma = (q^2/a)kT$ (where a is the average spacing and T the temperature) and the transition takes place at $\Gamma = 170$. the properties of proposed storage rings for heavy ions with $q >> e$, are such that an ordered array may actually be realized.

48354 (FNAL/C—86/52-E) Application of channeling in bent crystals to charged particle beams. Carrigan, R.A. Jr. (Fermi National Accelerator Lab., Batavia, IL (USA)). Mar 1986. Contract AC02-76CH03000. 37p. (CONF-8603114—2). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014371.

From Workshop on relativistic channeling acquafredda di Maratea; Maratea, Italy (31 Mar 1986).

The process of channeling of charged particle beams in bent crystals is described, including the effects of angular acceptance, spatial acceptance, normal dechanneling, bending dechanneling, and surface acceptance. Some bending applications that have been tried and future possibilities are reviewed. 29 refs., 30 figs. (LEW)

48355 (FNAL-TM—1405) Resonances and resonance widths. Collins, T. (Fermi National Accelerator Lab., Batavia, IL (USA)). May 1986. Contract AC02-76CH03000. 19p. NTIS, PC A02/MF A01. File Number DE86014462.

Two-dimensional betatron resonances are much more important than their simple one-dimensional counterparts and exhibit a strong dependence on the betatron phase advance per cell. A practical definition of "width" is expanded upon in order to display these relations in tables. A primarily pedagogical introduction is given to explain the tables, and also to encourage a wider capability for deriving resonance behavior and wider use of "designer" resonances.

48356 (FNAL-TM—1407) Resonance scraping. Collins, T. (Fermi National Accelerator Lab., Batavia, IL (USA)). Jun 1986. Contract AC02-76CH03000. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014468.

Protons lost in a ring leave at a few preferred locations, determined by some non-linear property of the dipoles. This paper suggests taking control of lost protons by beating the magnets at their own game - by means of a designed resonance used as a beam scraper. It is a study of suitable resonances, including estimates of the required multipole element strengths. The appropriate resonances are two-dimensional. A large number of figures is included.

48357 (NAC—84-08) Test results of the signal processing and amplifier unit for the emittance measurement system. Stawiszynski, L.; Schneider, S. (Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre). 1984. 22p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703170.

The signal processing and amplifier unit for the emittance measurement system is the unit with which the beam current on the harp-wires and the slit is measured and converted to a digital output. Temperature effects are very critical at low currents and the purpose of the test measurements described in this report was mainly to establish the accuracy and repeatability of the measurements under the influence of temperature variations.

48358 (SAND—86-1539C) Ion focused transport experiments on Sandia's recirculating linac. Shope, S.L.; Tucker, W.K.; Bennett, L.F.; Finch, J.L.; Frost, C.A.; Hasti, D.E.; Kamin, G.W.; Miller, R.B.; Poukey, J.W.; Reinstra, W.W. (Sandia National Labs., Albuquerque, NM (USA); Science Applications International Corp., McLean, VA (USA)). 1986. Contract AC04-76DP00789. 6p. (CONF-8606153—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012944.

From DARPA conference; Albuquerque, NM, USA (23 Jun 1986).

Ion focused transport has been used to generate and transport a 1.2-MeV, 25-kA relativistic electron beam around a 90° curved sector. Low-energy electrons, confined and guided by a weak longitudinal magnetic field, were used to form the ionized channel in low pressure argon. The successful demonstration of beam bending is applicable to the Sandia Recirculating Linac. Initial experiments with the recirculating accelerator injector have

demonstrated efficient generation and transport of a 1 MeV, 30 kA beam for more than a meter. 8 refs., 7 figs.

48359 **(SAND—86-1654C) Modeling WIPS tracking on RADLAC-II.** Freeman, J.R.; Marder, B.M.; Wagner, J.S. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 9p. (CONF-8606153—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014150.

From DARPA conference; Albuquerque, NM, USA (23 Jun 1986).

Computational modeling for the planned RADLAC-II WIPS tracking experiment is described. A cartesian version of the non-linear DYNADISC code has been developed and is being used for these studies.

48360 **(SAND—86-1748C) High current electron beam transport in linear induction accelerators.** Miller, R.B. (Sandia National Labs., Albuquerque, NM (USA). Directed Energy Research Dept.). 1986. Contract AC04-76DP00789. 104p. (CONF-860756—2). NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014112.

From NATO advanced study institutes program conference; Pitlochry, Scotland (13 Jul 1986).

In recent years a number of advanced linear induction accelerators (LIAs) have been developed which have the capability for accelerating very high electron beam currents, provided that satisfactory answers are obtained to number of beam transport and stability issues. In this review several important beam stability issues are identified pertaining to the propagation of very high current electron beams in and through the accelerating structures. In particular, criteria are developed for various equilibrium configurations, injector designs for producing the equilibria, general beam stability criteria, zero-order analyses of accelerating gap designs and considerations of various multiple-gap instabilities, including transverse beam break-up and image displacement. These analyses can be practically applied by illustrating the design of the beam transport line of the RADLAC-II accelerator. The new transport technique of ion channel guiding is briefly described.

48361 **(SLAC-PUB—3935) Comparison of standing-wave and traveling-wave structures.** Miller, R.H. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Apr 1986. Contract AC03-76SF00515. 7p. (CONF-860629—37). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014469.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

The controversy over the relative advantages of standing-wave and traveling-wave linear accelerators is now in its fourth decade. It has been fed by a considerable body of misinformation. The author hopes in this paper to shed some light on the subject, and expose some of the falsehoods. The discussion is directed toward the question of which structure to use for short pulse high field electron accelerators since it is almost universally accepted that standing-wave structures are appropriate for CW and long pulse accelerators. Three arguments against standing-wave accelerators are discussed and shown to be invalid.

48362 **(SLAC-PUB—3965) Radiation of a charge in a perfectly conducting cylindrical pipe with a jump in its cross section.** Kheifets, S.A.; Heifets, S.A. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 18p. (CONF-860629—30). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013438.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

Electromagnetic fields of a point charge moving on the axis of an infinitely long straight cylindrical superconducting pipe with a sudden change of its cross section are found. The longitudinal coupling impedance of this structure is calculated. The method developed can be applied to some other geometries of interest.

48363 **(SLAC-PUB—3977) Beam dynamics, efficiency and power of the SLAC lasertron: simulation results.** Welch, J.J. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 4p. (CONF-860629—28). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013508.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

Results are described for the computer simulation of the SLAC proof of principle lasertron device with a conventional single gap output cavity, using the 2D relativistic field and particle code called MASK. The rf to beam power efficiency is calculated for different power levels, dc voltages and optical pulse lengths. The calculated efficiency at the initial operating point of 50 MW beam power, 400 kV, and with 60 picosecond optical pulse duration, is 66%. The maximum rf power at 400 kV is about 50 MW. At 600 kV the maximum power increases to about 110 MW, but the efficiency at low power is not much changed from what it was at 400 kV. The simulation calculation does not take into account loss of rf power due to backscattered electrons nor the full effects of the impedance of the accelerating gap. A calculation of the efficiency of the lasertron with a double output cavity has been carried out, and generally yields efficiencies about 10 percentage points higher than the single cavity simulation.

48364 **(SLAC-PUB—3979) Beam-beam deflections as an interaction point diagnostic for the SLC.** Bambade, P.; Erickson, R. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 3p. (CONF-860629—35). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014087.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

A technique is described for non-destructive measurement and monitoring of the steering offset of the electron and positron beams at the interaction point of the SLC, based on using stripline beam-position monitors to measure the centroid of one beam as it is deflected by the opposing beam. This technique is also expected to provide diagnostic information related to the spot size of the micron-size beams.

48365 **(UCRL—93752) Empirical considerations for laser guided electron beams in the advanced test accelerator.** Rainer, F.; Caporaso, G.J.; Chong, Y.P.; Lauer, E.J.; Prono, D.S.; Struve, K.W.; Weir, J.T. (Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 6p. (CONF-860665—12). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013218.

From 6. international conference on high power particle beams; Kobe, Japan (9 Jun 1986).

Relativistic electron beam currents in excess of 10 kA have been propagated successfully for 64 m through the Advanced Test Accelerator (ATA), and up to 31 m beyond that, by means of an electro-static column of benzene ions generated by a KrF laser pulse. The immediate consequence was a dramatic reduction in transverse rf beam displacements to <0.1 mm. The absence of any magnetic focusing or steering necessitated stringent controls on the pointing, focusing, spatial uniformity and temporal stability of the ionizing laser. The control and monitoring of a benzene pressure profile in a hostile radiation environment have been addressed but still require constant attention. The subtleties of matching the electron beam between ion columns and magnetic transport out of the injector, at bends in the beam line, and at other transition zones are not yet fully understood. The consequences of temporal, spatial, and angular mismatch impact the electron beam output rise time, pulse shape, pulse length, total current, energy spread and emittance.

48366 **(UCRL—93757) Misalignment of axial B-field in the advanced test accelerator.** Lauer, E.J.; Caporaso, G.J.; Prono, D.S.; Weir, J.T. (Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 3p. (CONF-860665—14). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013222.

From 6. international conference on high power particle beams; Kobe, Japan (9 Jun 1986).

The Advanced Test Accelerator (ATA) has solenoidal magnets to focus and guide the electron beam. The transverse position of the center of mass of the beam is measured at many positions along the accelerator using the wall current monitors. With the steering coils off, the beam drifts off axis a few cm in the length of the machine. The drift is independent of several parameters: field strength, beam current, and beam energy. Further measurements to locate the source of the misalignment will be discussed. 1 ref., 4 figs.

48367 (UCRL—94348) **Approaching maximal performance of longitudinal beam compression in induction accelerator drivers.** Mark, J.W.K.; Ho, D.D.M.; Brandon, S.T.; Chang, C.L.; Drobot, A.T.; Faltens, A.; Lee, E.P.; Krafft, G.A. (Lawrence Livermore National Lab., CA (USA); Science Applications International Corp., McLean, VA (USA); Lawrence Berkeley Lab., CA (USA); CEBAF, Newport News, VA (USA)). 27 May 1986. Contract AC03-76SF00098;W-7405-ENG-48. 10p. (CONF-860510—12). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014428.

From Symposium on heavy ion fusion; Washington, DC, USA (27 May 1986).

Longitudinal beam compression is an integral part of the US induction accelerator development effort for heavy ion fusion. Producing maximal performance for key accelerator components is an essential element of the effort to reduce driver costs. We outline here initial studies directed towards defining the limits of final beam compression including considerations such as: maximal available compression, effects of longitudinal dispersion and beam emittance, combining pulse-shaping with beam compression to reduce the total number of beam manipulations, etc. The use of higher ion charge state $Z \geq 3$ is likely to test the limits of the previously envisaged beam compression and final focus hardware. A more conservative approach is to use additional beamlets in final compression and focus. On the other end of the spectrum of choices, alternate approaches might consider new final focus with greater tolerances for systematic momentum and current variations. Development of such final focus concepts would also allow more compact (and hopefully cheaper) hardware packages where the previously separate processes of beam compression, pulse-shaping and final focus occur as partially combined and nearly concurrent beam manipulations.

48368 (UCRL—94759) **ATA operations.** Weir, J.T.; Caporaso, G.J.; Chambers, F.W.; Chong, Y.P.; Prono, D.S.; Rainer, F. (Lawrence Livermore National Lab., CA (USA)). 20 Jun 1986. Contract W-7405-ENG-48. 6p. (CONF-8606153—5). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013019.

From DARPA conference; Albuquerque, NM, USA (23 Jun 1986).

Four accelerator parameters were found to control the condition of the electron beam entering the Intergrated Fast Reactor (IFR). These parameters were the matching of the electron beam to the ion channel, the laser timing, the benzene pressure at the entrance to the IFR, and the timing of the accelerator gaps. Manipulation of these parameters make possible the control of the total current, the emittance, the pulse length, the mixture of laser induced current and cathode current, the radial growth in time, the final size of the beam, and the energy variation through the pulse. 1 fig.

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REFER ALSO TO CITATION(S) 48430, 48431, 48432, 48519, 48520, 48521, 48527, 48534, 48538, 48615, 48617, 48649, 49114

48369 (ANL—85-22, pp 113-114) **Design and construction of a scattering chamber facility for ATLAS.** Kovar, D.G.; Sanders, S.J.; Falout, J.; Nardi, B. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The types of experiments expected to be performed using the beams of ATLAS placed a number of constraints on the kind of chamber to be built and in the end determined the conceptual flexible design chosen. The design work for all the major components of the chamber was completed in the fall of 1984 and at the present time all the essential components are in the process of being fabricated and are at various stages of completion. Installation of the vacuum chamber is expected to occur in early spring of 1985. Tests of the chamber with beams are planned for the summer of 1985. Work on other aspects of the project are also progressing well. The control electronics for local and remote control of the chamber motions has been designed and is scheduled for fabrication. The PDP11/23 computer and associated peripherals have been delivered and tested. Work on setting up the basic structure for the software has begun. The control system is expected to be operational, in a primitive form, for the shake-down tests in summer.

48370 (ANL—85-22, pp 115-116) **Nuclear target making and development.** Klimczak, G.W.; Thomas, G.E. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The Physics Division operates a facility which produces and coordinates production of thin targets for charged-particle induced experiments, primarily at the Tandem-Linac and Dynamitron accelerators. In addition, these thin films are occasionally prepared for other scientific purposes. The services of the nuclear target-making facility are available to the Physics Division, other divisions of the Laboratory, and other scientific institutions. In addition to the typical production requirements, research work is performed in this facility to develop new techniques, as well as to implement and advance new state-of-the-art techniques developed at other institutions. Several new facilities and items of equipment are described.

48371 (ANL—85-22, pp 116-117) **Physics Division computer facilities.** Welch, L.C.; Cyborski, D.; Moog, T.; Stewart, J.; Loucks, D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The VAX 780 continues to function as the major computer resource for the purpose of replaying event mode tapes. The computer has been moved to a new location which provides for much better climatic and cleanliness control. A VAX 750 has been received to support the medium energy research program and will be installed in a trailer house. This computer, too, will be used as a DAPHNE data acquisition system and is being developed in parallel with the ATLAS system. A DecNet using Ethernet is in the process of being constructed. The cabling and necessary interface to the VAX 780 is installed. The routing of the Ethernet is such that the medium energy VAX 750 in the trailer house, the ATLAS VAX 750, and the Dynamitron VAX 750 are accessible.

48372 (ANL—85-22, pp 117) **Data acquisition system DAPHNE.** Welch, L.C.; Moog, T.; Stewart, J.; Loucks, D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

DAPHNE is a data acquisition system which is being created to satisfy the needs of the accelerator based experimental research program of the division in particular the one at ATLAS. It is CAMAC based with a hardware front end consisting of multiple single board processors in a Multibus cage to provide a parallel processing capability. The host computer, a VAX 750, will provide for data logging, histogram memory space, and user interaction. The first DAPHNE system is being designed and constructed for use by ATLAS and is expected to be ready by late spring, 1985.

48373 (ANL—85-22, pp 158) **Alignment of deuterons by optical pumping.** Peshkin, M. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A semi-quantitative model has been worked out to describe a scheme evolved by Roy Holt to align deuterons for use in an inter-

nal target of a GeV electron accelerator. Holt's procedure is based on the optical-pumping spin-exchange process. He exposes a cell containing atomic deuterium and sodium vapor to circularly polarized laser light. Resonant absorption and re-emission of the light polarizes the sodium atoms. Spin-exchange sodium-deuterium collisions polarize the deuterium electron spins. The deuterium nuclei are then polarized and aligned by hyperfine interaction. The present model includes deuterium flow-through, repeated collisions, diffusion, and wall effects in a semi-quantitative way to identify the key parameters which determine the polarization and alignment of the deuterium nuclei under various conditions. A full report of this work will be submitted for publication.

48374 (ANL—85-22, pp 169) **Superconducting magnets.** Pardo, R.C.; Bogaty, J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A large superconducting dipole magnet built as the prototype for several possible applications was described in last year's report. This magnet has now been fully tested and mounted on the primary ATLAS beam line, where it will serve as a beam switch that distributes the ATLAS beam to several experimental stations. An objective of the ATLAS project is to form two independent beams for simultaneous use in different experimental areas. A component of the splitting system is a flux shield super tube. Several kinds of super tubes have been tested and found to be satisfactory. The best units tested to date are devices borrowed from S. Loriant of SLAC. These units provide good shielding in magnetic fields up to 1.5 tesla, which is more than adequate for the authors' purpose.

48375 (ANL—85-22, pp 170-171) **Superconducting positive-ion injector.** Bollinger, L.M.; Pardo, R.C.; Shepard, K.W. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In last year's report, the authors described a long-range plan to upgrade the performance of ATLAS by replacing the present negative-ion source and tandem injector with a positive-ion system consisting of an electron cyclotron resonance (ECR) ion source and a superconducting injector linac. The ultimate objective of this upgrade is to (1) increase the beam current by a large factor and (2) to extend the mass range up to uranium. Planning for the positive-ion injector is progressing vigorously. At this stage of the work, the most critical activity is the development of a suitable accelerating structure for slow-moving ions. A first prototype of such a structure is nearing completion. In addition considerable effort has been devoted to a study of the beam dynamics of the injector linac.

48376 (ANL-HEP-CP—86-74) **Offline computing and networking.** Appel, J.A.; Avery, P.; Chartrand, G.; Day, C.T.; Gaines, I.; Georgiopoulos, C.H.; Gilchriese, M.G.D.; Goldman, H.; Hoftun, J.; Linglin, D. (Argonne National Lab., IL (USA)). 1985. Contract W-31-109-ENG-38. 15p. (CONF-8511150—11). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014605.

From Workshop on triggering, data acquisition and computing for high energy/high luminosity hadron-hadron colliders; Batavia, IL, USA (11 Nov 1985).

This note summarizes the work of the Offline Computing and Networking Group. The report is divided into two sections; the first deals with the computing and networking requirements and the second with the proposed way to satisfy those requirements. In considering the requirements, we have considered two types of computing problems. The first is CPU-intensive activity such as production data analysis (reducing raw data to DST), production Monte Carlo, or engineering calculations. The second is physicist-intensive computing such as program development, hardware design, physics analysis, and detector studies. For both types of computing, we examine a variety of issues. These included a set of quantitative questions: how much CPU power (for turn-around and for through-put), how much memory, mass-storage, bandwidth, and so on. There are also very important qualitative issues: what features must be provided by the operating system, what tools are needed for program design, code management, database management, and for graphics.

48377 (BNL—38307) **Particle production and targeting experience at the Brookhaven AGS.** Lazarus, D.M. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 7p. (CONF-8606128—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014134.

From Production and transport of secondary beam at a kaon factory workshop; Vancouver, B.C., Canada (1 Jun 1986).

Experience in production of secondary pions (neutrinos), kaons and antiprotons by 28.5 GeV/c protons incident on various target materials is given. The problems associated with various target materials with respect to target heating, physical degradation and in some cases, disintegration, are discussed. The effect of target length and production angle on secondary beam flux and optical quality will be illustrated by some incomplete but nonetheless informative data.

48378 (BNL—38310) **BNL kaon beams, present and planned.** Lazarus, D.M. (Brookhaven National Lab., Upton, NY (USA). AGS Dept.). 1986. Contract AC02-76CH00016. 15p. (CONF-8606128—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014132.

From Production and transport of secondary beam at a kaon factory workshop; Vancouver, B.C., Canada (1 Jun 1986).

At the present time, there are three electrostatically purified (separated) kaon beams in operation at the Brookhaven AGS. They are optimized for .8 GeV/c, 1.1 GeV/c and 6 GeV/c. A fourth beam has been designed for a maximum momentum of 2.0 GeV/c. It features two-stage purification and higher order optical corrections. Anticipated performance figures for the beam, which is capable of delivering more than 10^6 kaons per spill, are given, as well as measured performance figures for the existing beams. Possible purification schemes for momenta above 6 GeV/c are discussed. Performance data from neutral and unpurified beams are presented.

48379 (BNL—38387) **Statistical and signal-processing concepts in surface metrology.** Church, E.L.; Takacs, P.Z. (Army Research and Development Command, Dover, NJ (USA); Brookhaven National Lab., Upton, NY (USA)). Mar 1986. Contract AC02-76CH00016. 10p. (CONF-860366—10). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014176.

From SPIE technical symposium on applications of artificial intelligence; Orlando, FL, USA (31 Mar 1986).

This paper proposes the use of a simple two-scale model of surface roughness for testing and specifying the topographic figure and finish of synchrotron-radiation mirrors. In this approach the effects of figure and finish are described in terms of their slope distribution and power spectrum, respectively, which are then combined with the system point spread function to produce a composite image. The result can be used to predict mirror performance or to translate design requirements into manufacturing specifications. Pacing problems in this approach are the development of a practical long-trace slope-profiling instrument and realistic statistical models for figure and finish errors.

48380 (BNL—38398) **Laser-Electron-Gamma-Source. Progress report, July 1986.** Dowell, D.H.; Fineman, B.; Giordano, G.; Kistner, OC.; Matone, G.; Sandorfi, A.M.; Schaerf, C.; Thorn, C.E.; Ziegler, W. (Brookhaven National Lab., Upton, NY (USA)). Jul 1986. Contract AC02-76CH00016. 19p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013918.

When completed, the Laser Electron Gamma Source (LEGS) is expected to provide intense beams of monochromatic and polarized (circular or linear) gamma rays with energies up to 500 MeV. The gamma-ray beams will be produced by Compton backscattering uv laser light from the electrons circulating in a storage ring. Progress with installation of the facility is described, particularly the Ar-ion laser and tagging spectrometer. Tests of the tagging spectrometer coponents is reported, and a second laser is described for higher energy operation. Estimates are given of expected beam parameters. Experimental equipment for the planned research projects to be carried out at the LEGS facility is discussed. (LEW)

48381 (CONF-8605131—2) Status of the ATLAS PIIECR ion source project. Pardo, R.; Minehara, E.; Lynch, F.; Billquist, P.; Evans, W.; Clifft, B.E.; Waterson, M. (Argonne National Lab., IL (USA)). 1986. Contract W-31-109-ENG-38. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014599.

From 7. international ECR source workshop; Julich, F.R. Germany (22 May 1986).

The ATLAS PIIECR ion source is a major component of a project which will result in the replacement of the ATLAS tandem electrostatic injector with a superconducting linac of extremely low velocity profile and an ECR ion source operating in the continuous mode. A compilation of the source parameters adopted is tabulated, and the various issues considered in the design process and decisions made regarding those issues are discussed. (LEW)

48382 (DOE/ER/10759—6) Operation, maintenance and upgrading of SUNY facilities at the National Synchrotron Light Source. Final report, 1 October 1980-31 May 1986. Prewitt, C.T. (State Univ. of New York, Stony Brook (USA). Research Foundation). 1986. Contract AC02-80ER10759. 12p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013985.

A general facility is how operating and generating research results in x-ray scattering, diffraction, and spectroscopy. The contract just completed involved the construction and development of a single beamlines at NSLS subdivided to allow for diversity of experimental techniques. These include single-crystal diffraction at low temperatures and at high pressures, uhv surface studies using standing waves, time-resolved, small-angle scattering, and x-ray spectroscopy.

48383 (FNAL-TM—1403) Fundamentals of magnetic measurements with illustrations from Fermilab experience. Brown, B.C. (Fermi National Accelerator Lab., Batavia, IL (USA)). May 1986. Contract AC02-76CH03000. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014465.

Techniques for measurement of magnets used in accelerators and beams are discussed with emphasis on principles and limitations of the various techniques. Selection of parameters to measure, mechanical, electronic and data collection issues will be discussed. Illustrations will primarily be selected from the experience in measuring more than 1200 superconducting and more than 600 conventional magnets for the Tevatron at Fermilab.

48384 (FNAL-TM—1406) Offset coil designs for superconducting magnets, a logical development. Collins, T. (Fermi National Accelerator Lab., Batavia, IL (USA)). Mar 1986. Contract AC02-76CH03000. 22p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014464.

Dipoles and quadrupoles for any new, large proton ring must be stronger, smaller and have better field shape (systematic error) than those used in the Doubler. The present two-shell designs are rigid in that the coils are too thin but cannot be relatively fatter without destroying the field quality. An examination of the coil shapes for dipoles and quadrupoles which produce perfect fields from a uniform current density shows clearly that our persistent use of a circular form for the inner surface of the coils is a poor approximation. When this is corrected by "offsets" there is a striking improvement both in the strength of fields and in the field quality. The same analysis makes clear that the efficient use of superconductor and the overall magnet size is determined by the perfect coil shapes. Any reasonable magnet will not differ significantly from the ideal for these parameters. This will be particularly helpful in setting design goals for very large quadrupoles. The offset two-shell dipole design preserves the mechanical features of the highly successful, resilient doubler magnets while greatly extending the performance.

48385 (FNAL-TM—1409) Sub-cooled liquid helium flow supply for design D magnet cooling at MDTF. Ohmori, T. (Fermi National Accelerator Lab., Batavia, IL (USA)). Jul 1986. Contract AC02-76CH03000. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014463.

The parameters of the subcooled 4ATM helium flow from MTDF refrigerator and helium subcooler proposed to cool the SSC Design 'D' magnet is discussed. The system operating parameters are pressure - 4ATM and temperature - 4.35K. The higher than normal operating pressure is obtained by shutting down the cold turbine (T2) of MTDF refrigerator, and then not J-T the high pressure dense helium gas until after the magnet and liquid return line. The resultant helium temperature at the refrigerator outlet is described and the heat transfer tube length of the subcooler required to cool the flow to the ultimate desired temperature is evaluated.

48386 (FNAL-TM—1412) Magnetic measurements of the correction and adjustment magnets of the main ring. Trbojevic, D. (Fermi National Accelerator Lab., Batavia, IL (USA)). Jul 1986. Contract AC02-76CH03000. 39p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014466.

Correction magnets correct the field imperfections and alignment errors of the main quadrupole and bend magnets. For reducing and controlling chromaticity there are 186 sextupoles and 78 octupoles, while for suppressing various resonances there are 12 normal and 18 skew sextupoles and 24 normal and 19 skew quadrupoles. Beam positions are individually controlled by 108 horizontal and 108 skew dipoles. This report includes results of the all Main Ring correction and adjustment magnet harmonic measurements. The measurement principle and basic equations are described.

48387 (INIS-mf—10408) KVI cyclotron: from injection to extraction. Asselt, W.K. van. (Rijksuniversiteit Groningen (Netherlands)). 15 Mar 1985. 88p. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703172.

The cyclotron at the KVI at Groningen (Netherlands) is a three-sector isochronous cyclotron for the acceleration of particles with different charge to mass ratios to a variable energy. In this thesis, a numerical study is presented with the aim to obtain a beam, which is well centred when it leaves the central region. 'Centring' in this respect implies that the mean position of the orbit centers is located within 1 mm with respect to the axis of the magnetic field. The application of field bumps for centring the beam has been studied and the influence of these bumps on the beam quality is described. Aspects of the acceleration process between the central region and the extraction radius are treated. An experimental study is given of the extraction process in which different beam loss mechanisms are diagnosed. Experiments with two different extraction systems are described. The operation of the cyclotron in combination with the axial injection system during the first half of 1984 is described. Includes Dutch summary; 47 refs.; 52 figs.; 5 tabs.

48388 (INS-J—169) Recent experimental results at Tokyo Electron Synchrotron. Kato, Sadayuki. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Oct 1984. 37p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703169.

Completed in 1961, the electron synchrotron has been continually improved; it is now operated at 1.3 GeV with intensity 2.5 x 10^{12} electrons/sec. In the experimental area there are five beam channels, which are low intensity photons, breamsstrahlung photons, electrons, soft X-rays and fast extracted electrons. A storage ring is used in solid state physics; injection of electrons into the ring is made three times a day, being accelerated up to 400 Mev. Contents are the following: phenomenological analyses of pion photoproduction, photocouplings of $\gamma p \rightarrow \gamma p$ reaction, deutron photodisintegration, neutral pion photoproductions on deuteron, and the nucleon correlation in nuclei.

48389 (KEK—84-13) Proceedings of the workshop on data acquisition system for high energy physics. Hayano, R.S. (ed.). (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Sep 1984. 125p. (In Japanese). (CONF-8405417—Summs.). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703177.

From Workshop on data acquisition system for high energy physics; Ono, Ibaraki, Japan (28 May 1984).

The workshop "Data acquisition system for high energy experiment" was held by the on-line electronics group of KEK in cooperation with the data processing section on May 28-29, 1984, at

KEK. This year, the proton synchrotron is prepared for the work after shutdown, and in the TRISTAN, the full scale construction of the data acquisition system is advanced. One of the large topics was the TKO box proposed by the data acquisition development group of KEK, and its specification is included in this book. This workshop was the meeting with very wide range from front end electronics to large computers. The talks on flash analog/digital converters and latest data communication were held. As a new trial, the wish lists on the future development and support of on-line electronics and others were collected from the participants, and these were deliberated by all the members. The contents of the discussion at this time are given in this book. The summaries of the lectures presented at the meeting are collected in this book. The interchaage with the experimental group is indispensable for the activities of the on-line electronics group, accordingly, the workshop like this will be held hereafter.

48390 **(KFK—4023) Electron cooling for low-energy antiprotons.** Wolf, A. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik; Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Physik). Feb 1986. 165p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE86752597.

Divergence and size of stored ion beams can be reduced superimposing on them an intense, monoenergetic electron beam with little transverse motion ('electron cooling'). The present work first considers the theoretical foundations of the method and then describes the planning and construction of an electron beam device for cooling antiprotons with MeV energies in the storage ring LEAR and CERN. With respect to the quantitative description of the method, the microscopic processes during the damping of the ion motion, the effect of the damping on an ion in a storage ring, and the properties of the intense, magnetically guided electron beam are discussed. Special attention is paid to the improvement of ion beam cooling due to the magnetic field guiding the electron beam. The electron beam device, operated in ultra-high vacuum, and the experience gained during its construction are described; experiments performed during the test period are presented. The work further develops a numerical simulation of electron cooling on the basis of the theory discussed. Given realistic external parameters, the simulation yields cooling times and equilibrium states of the ion beam during electron cooling in a storage ring. Finally, non-destructive methods for measuring the velocity distribution in the electron beam are described, which may prove helpful for optimizing the beam cooling.

48391 **(LA—10599) 0.8-GeV/c kaon channel for LAMPF II.** Lobb, D.E. (Los Alamos National Lab., NM (USA)). Jul 1986. Contract W-7405-ENG-36. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014883.

The design for a 0.8-GeV/c charged-kaon channel suitable for LAMPF II features a two-dipole extraction system in the primary proton-beam line, a section to define the phase-space acceptance of the channel, a separator section before a mass slit, and a quadrupole triplet to transmit the kaon beam to an experimental target. A novel feature of this channel is a shaped slit to remove the tail of the pion-beam spot that would be adjacent to the kaon-beam spot at the mass slit.

48392 (LA—10655-C, pp 95-112) **NPL upgrade.** McClelland, J.B. Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

LAMPF has embarked on a major three year development program to upgrade the Nucleon Physics Laboratory (NPL) to both enhance ongoing experimental programs and to provide facilities for new physics research in nucleon charge-exchange reactions. This talk concentrates on the new physics opportunities presented by this upgrade with a brief description of the experimental facilities.

48393 (LA—10655-C, pp 113-123) **WNR neutron source.** Lisowski, P.W. Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

The Weapons Neutron Research (WNR) facility is a versatile pulsed neutron source used in a wide variety of research programs. In this talk the WNR Facility and the experimental program are described with emphasis on the potential of the WNR for studying nuclear physics issues.

48394 **(LA-UR—86-2388) Pulsed magnetic field for PHERMEX-injected circular accelerator.** Moir, D.C.; Ruhe, J.R.; Armstrong, W.T. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 9p. (CONF-860703—15). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013842.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

The PHERMEX accelerator is a standing wave, 50 MHz rf linear accelerator. The rf fields in three cavities are pulsed for a period of 3 ms. The experiments described are directed toward studying injection and trapping of electron rings at modes field strengths (approximately 1 T). A single 200 ns beam macropulse is to be injected transverse to a solenoidal field, which is tilted at a small angle relative to the beam normal so that a beam micropulse does not return and strike the injection point. The pulsed field coils and vacuum chamber are reported under construction, and the capacitor bank being tested. (LEW)

48395 **(NAC—83-02) Final magnetic shimming of vacuum chamber suspension holes on the sector magnets.** Bader, D.; Jungwirth, H.N. (Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre). 1983. 6p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703173.

The 48 holes in the pole faces of the sector magnets for suspending the vacuum chamber reduce the magnetic field locally. These field perturbations have been measured on 5M4 and the optimum thickness of the magnetic shims to be used for correcting them has been determined. The report mentions that the shimming of the magnetic field perturbations due to the vacuum chamber suspension holes in the pole faces was successful.

48396 **(NAC—83-03) Investigation of current setting procedures for sector magnets.** Bader, D. (Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre). 1983. 6p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703174.

Because of the huge iron mass which must be magnetized when setting a field, it takes some time until the gap field settles. To cut the process down in time it is common practice to overshoot the set level by a few percent. The results of the measurements to find the optimum excess and overshooting time obtained so far are gathered in this report.

48397 **(NAC—83-07) Building of a prototype steering magnet.** Conradie, J.L.; Cornell, J.C. (Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre). 1983. 12p. (In Afrikaans). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703175.

The report deals with the building of a prototype magnet. The magnet is completely symmetrical, and consists of 4 identical pieces of iron, 167 x 80 x 15 mm each. Magnetic flux density for 4 different magnet coils is given. Information is also given on the magnetic fields and the bending ability of the field through which the particles are supposed to move. The magnet coils and the form of the yoke are described.

48398 **(NAC—83-08) Optimization of ion source positions in SPS1.** Burger, S.J. (Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre). 1983. 17p. (In Afrikaans). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703171.

After previous studies a 3:1 scale electrolytic tank model was designed for the determination of the form of electrical fields. Determinations of the fields showed that the determined position of the ion source did not deliver well-centered circuits. At this stage it was again decided to determine optimal positions for the ion

sources. The results for calculations in the case of 8 MeV protons are supplied.

48399 **(NAC—84-15) Design of a sending magnet for the high energy beamline.** Conradie, J.L.; Fourie, D.T.; Cornell, J.C. (Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre). 1984. 20p. (In Afrikaans). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703176.

On the high energy beamline of the National Accelerator Centre the beam appeared to disregard the calculated path. To correct these deflections sending magnets will be used at various places on the beamline. Magnets for the external beamline were designed and a prototype was build to establish if it is functioning according to the specifications. Information on the following aspects is provided: specifications for the magnets; the determination of magnetic stiffness of 220 MeV protons; physical measurement of the magnets; magnetic pole pieces; the magnetic-motoric force needed for the maximum flux density; coil resistance and dimensions; magnetic fields and the stability of the power plant.

48400 **(SLAC/AP—51) Some problems on rf breakdown in room temperature accelerator structure, a possible criterion.** Wang, J.W. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Apr 1986. Contract AC03-76SF00515. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013386.

The discussion is confined to high gradient, room-temperature accelerators which have clean well-finished cavity surfaces and good vacuum conditions. Breakdown-initiating mechanisms due to "cold" field electron emission occurring at isolated sites on broad-area cavity surfaces, where the field is enhanced, are described. The influences of an alternating field and transition time tunneling are taken into account. The thermal instability resulting in vacuum voltage breakdown is hypothesized to derive a new criterion for room-temperature accelerator structure. 18 refs., 5 figs. (DWL)

48401 **(SLAC-CN—334) Master oscillator stability requirements considerations.** Schwarz, H.; Vancraeynest, J. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). 24 Jun 1986. Contract AC03-76SF00515. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014118.

This note attempts to point out some ideas about the required stability of the 476 MHz master oscillator, assuming that the phase noise of the oscillator is the only source of noise in the accelerator system.

48402 **(SLAC-PUB—3940) Rf breakdown studies in a SLAC disk-loaded structure.** Wang, J.W.; Nguyen-Tuong, V.; Loew, G.A. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Apr 1986. Contract AC03-76SF00515. 4p. (CONF-860629—39). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014650.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

Rf breakdown studies in an S-band standing-wave disk-loaded accelerator structure have been completed. An equivalent traveling-wave accelerating gradient as high as 147 MV/m and a peak field in excess of 300 MV/m have been obtained. At these high gradients, considerable amounts of field emission and x-ray radiation are observed. Some of the field-emitted electrons are captured and focused by the rf fields and can be extracted on the axis of the structure. Their current, energy distribution and the x-ray radiation they produce are given. Rf processing as measured by the frequency of breakdown and the reduction in field emitted electron currents inside the structure can be speeded up considerably by the presence of argon. Some conjectures on the causes of breakdown are presented.

48403 **(SLAC-PUB—3945) SLC energy spectrum monitor using synchrotron radiation.** Seeman, J.; Brunk, W.; Early, R.; Ross, M.; Tillmann, E.; Walz, D. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Apr 1986. Contract AC03-76SF00515. 4p. (CONF-860629—34). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013507.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

The SLAC Linac is being upgraded for the use in the SLAC Linear Collider (SLC). The improved Linac must accelerate electron and positron bunches from 1.2 GeV to 50 GeV while producing output energy spectra of about 0.2%. The energy spectra must be maintained during operation to provide for good beam transmission and to minimize chromatic effects in the SLC ARCs and Final Focus. the energy spectra of these beams are determined by the bunch length and intensity, the RF phase and waveform and the intra-bunch longitudinal wakefields. A non-destructive energy spectrum monitor has been designed using a vertical wiggler magnet located downstream of the horizontal beam splitter at the end of the SLC Linac. It produces synchrotron radiation which is viewed in an off-axis x-ray position sensitive detector. The expected resolution is 0.08%. The design considerations of this monitor are presented in this paper. A pair of these monitors is under construction with an installation date set for late summer 1986. 5 refs., 6 figs.

48404 **Multiwire secondary emission beam profile monitor with 20 μm resolution.** Krider, J.; Hojvat, C. (Fermi National Accelerator Lab., Batavia, IL, USA). 247: No. 2, 304-308(15 Jun 1986).

A 20 μm resolution multiwire beam profile monitor has been designed for the Fermilab antiproton source. The monitor consists of closely packed wires operating by secondary emission (SEM).

48405 **Increasing the energy of SLC by transient wake field.** Yao, C.G.; Ecklund, S. (Stanford Linear Accelerator Center, CA, USA). 247: No. 2, 301-303(15 Jun 1986). Contract AC03-76SF00515.

Also published as report SLAC-CN--306.

This paper describes a way to make use of the field excited by the beam in the disk-loaded waveguide combined with the RF field in phase, to increase the output energy of the linear accelerator at the expense of beam duty cycle. Actually, the whole facility can be operated with both a Linac and storage rings.

48406 **Optically pulsed electron accelerator.** Fraser, J.S.; Sheffield, R.L. (to Dept. of Energy). US Patent Application 6-736,033. 20 May 1985. 14p. Contract W-7405-ENG-36. DE86013719 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013719.

An optically pulsed electron accelerator can be used as an injector for a free electron laser and comprises a pulsed light source, such as a laser, for providing discrete incident light pulses. A photoemissive electron source emits electron bursts having the same duration as the incident light pulses when impinged upon by same. The photoemissive electron source is located on an inside wall of a radiofrequency-powered accelerator cell which accelerates the electron burst emitted by the photoemissive electron source.

48407 **Versatile monochromator for synchrotron x-rays.** Staudenmann, J.L.; Sandholm, M.; Chapman, L.D.; Liedl, G.L. (Ames Lab., IA). 222: 177-179(1984). Contract W-7405-ENG-82;AC02-80ER10744.

A versatile fixed exit double monochromator system was designed and constructed for NSLS to provide full flexibility in the selection of high energy X-ray photons for X-ray scattering experiments. The system is designed for operation in a helium atmosphere with beryllium window isolation. A water cooled tantalum slit which opens symmetrically is included to allow a horizontal beam of 8 mrad (~ 100 mm wide white beam) at 12 m from the source. A variety of focusing devices and crystals can be mounted onto each goniometer. The system will allow a Bragg angle range from 3.5 to 86.5° and the independent control provides the opportunity for the low dispersive (mixed crystals) as well as the standard non-dispersive arrangement. 11 references, 1 figure.

4304 Storage Rings

REFER ALSO TO CITATION(S) 48356

48408 (ANL—85-22, pp 18-20) **Feasibility study of electron-scattering experiments with a tensor-polarized deuterium target in an electron storage ring.** Holt, R.J.; Geesaman, D.F.; Goodman, L.S.; Green, M.; Kowalczyk, R.; Napolitano, J.; Peshkin, M.; Ungricht, E.; Young, L.; Zeidman, B. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The feasibility of using a spin-exchange optical-pumping method to produce a high flux of tensor-polarized deuterium atoms is being tested. In this method, alkali atoms are polarized by optical pumping and the polarization is transferred to deuterium by successive spin-exchange collisions. In a test with a simple model the authors achieved 10 mW of laser power absorbed to the spin-exchange process with deuterium. Construction of a more sophisticated prototype was completed and tests are in progress. Dissociation fractions in excess of 80% for deuterium molecules have been achieved thus far. In order to optimize the performance of the prototype target, a computerized model of the target was constructed. A section of a differential-pumping system was constructed and tested. It was possible to sustain more than the required 5 orders-of-magnitude pressure drop in a distance of approximately 1.5 m.

48409 (CONF-860575—20) **Storage rings for heavy-ion atomic and nuclear physics.** Young, G.R. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013343.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

A brief review is given of the physics goals and a few of the accelerator physics issues relevant to the new generation of small storage rings being built for atomic and nuclear physics use.

44 INSTRUMENTATION

REFER ALSO TO CITATION(S) 48302

4401 Radiation Instrumentation

REFER ALSO TO CITATION(S) 48115, 48626, 48758, 49113, 49364, 49426, 49437

48410 (AD-A—167381/3/XAB) **Detection of alpha-particle interactions using the track-etch technique. Master's thesis.** Myers, R.C. (Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA). School of Engineering). Mar 1985. 68p. NTIS MF A01.

In this thesis the author developed and set up experimental procedures and methodologies for detection of low-energy alpha particles using the track-etch technique. Three track-etch materials, lexan polycarbonate, cellulose nitrate, and CR-39, were exposed to various-energy alpha particles. The exposure resulted in the formation of atomic-scale damage tracks within each material. Because the damage tracks were on an atomic scale in size, they could not be optically seen unless enhanced or enlarged by some physical means. Three methods of enhancement were performed on the exposed track-etch materials. These methods were chemical etching, electrochemical etching, and a combination of the two. The results indicted that all three etching methods provided adequate enhancement of the alpha damage tracks, thereby showing that low-energy charged particles can be detected using the track-etch technique.

48411 (AERE-R—11694) **Sources of series resistance in the Harwell solid state alpha detector.** Rawlings, K.J. (UKAEA Atomic Energy Research Establishment, Harwell. Instrumentation and Applied Physics Div.). Dec 1985. 17p. H.M. Stationery Office, London, price Pound 4.00.

The metal-semiconductor contacts to the Harwell solid state alpha detector have been characterized and the effect of the contact geometry has been assessed. To a reasonable approximation the latter gives rise to an emitter series resistance with an expected range of 20 +- 8 ohms. The contacts behave like parallel RC networks which become noticeably frequency dependent above ca. 100 kHz. Up to this frequency the emitter contact is likely to add 6 +- 4 ohms to the series resistance and the contribution from the base contact varies inversely with the square of the diode's diameter, being 5 +- 3 ohms for a diode with a diameter of 30 mm.

48412 (AERE-R—11926) **Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.** Harrison, K.G. (ed.). (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). Aug 1985. 43p. H.M. Stationery Office, London, price Pound 5.00.

A report is given of an intercomparison exercise on personnel neutron dosemeters based on proton-sensitive track detectors. The report consists of nine brief papers describing the dosemeters used and the results obtained by each of the participants. The background (in terms of dose equivalent from normally incident AmLi neutrons) is given for 11 measurements for exposure to 4.56mSv AmLi neutrons as well as the standard deviation in the background. All nine papers were indexed separately.

48413 (AERE-R—11926, pp 1-3) **NRPB neutron personal dosemeter: dependence of response on neutron energy.** Bartlett, D.T.; Steele, J.D. (National Radiological Protection Board, Chilton, UK). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of a dosemeter pack used in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive tract detectors. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48414 (AERE-R—11926, pp 5-11) **Results of CENDOS CR-39 neutron irradiations.** Civolani, O.; Lembo, L. (ENEA, Bologna, Italy Lab. Applicazioni di Dosimetria). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of two types of neutron dosemeters used in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48415 (AERE-R—11926, pp 13-16) **Intercomparison of neutron irradiations (CR-39 dosemeters).** Decossas, J.L.; Vareille, J.C. (Limoges Univ., France. Lab. d'Electronique des Polymeres sous Faisceaux Ioniques). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of two types of neutron dosemeters used in an intercomparison exercise on personnel dosemeters based on proton sensitive track detectors. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48416 (AERE-R—11926, pp 17-20) **Summary of results obtained at AERE using electrochemical etching of commercial grade CR-39.** Haigh, R.M.; Harrison, K.G. (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of the use of CR-39 in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. Details of the etching, assessment

and results are presented and discussed in terms of measured dosemeter senstitivities.

48417 (AERE-R—11926, pp 21-24) **Summary of results obtained at AERE using electrochemical etching of Bristol University CR-39.** Harrison, K.G.; Haigh, R.M. (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of the use of CR-39 in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. The CR-39 sheet was manufactured at the University of Bristol and comparisons of its performance are made with commercially available CR-39. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48418 (AERE-R—11926, pp 25-30) **CENDOS joint neutron irradiation exercise - results from Berkeley Nuclear Laboratories.** Harvey, J.R.; Weeks, A.R. (Central Electricity Generating Board, Berkeley, UK. Berkeley Nuclear Labs.). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of the use of CR-39 in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities. A description is also given of the reading system used which consists of a videcon tube, television monitor and image analysis system.

48419 (AERE-R—11926, pp 31-34) **Response of electrochemically etched Kodak CN85 track detector to neutrons.** Medioni, R.; Spurny, F. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92, France). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of four detectors used in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. The detectors used all consisted of KODAK CN85 cellulose nitrate but with different coverings or radiators, Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48420 (AERE-R—11926, pp 35-36) **CENDOS neutron irradiation of Bristol CR-39.** Worley, A.; Fews, A.P.; Henshaw, D.L.; Portwood, T.; Turner, T.W. (Bristol Univ., UK. H.H. Wills Physics Lab.). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of two CR-39 dosemeters used in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48421 (AERE-R—11926, pp 37-39) **Intercomparison data (CR 39 detectors).** Tommasino, L.; Zapparoli, G. (ENEA, Casaccia, Italy. Centro Ricerche Energia). Aug 1985. H.M. Stationery Office, London, price Pound 5.00.

In Neutron irradiations of proton-sensitive track detectors: results of a joint irradiation organised by CENDOS.

A brief description is given of the use of CR-39 in an intercomparison exercise on personnel neutron dosemeters based on proton sensitive track detectors. A boron radiator (for thermal neutrons) and a polythene radiator (for fast neutrons) were used. Details of the etching, assessment and results are presented and discussed in terms of measured dosemeter sensitivities.

48422 (ANL—85-22, pp 13-15) **Focal-plane detector for 1.6-GeV spectrometer at SLAC.** Geesaman, D.F.; Green, M.C.; Holt, R.J.; Jackson, H.E.; Kowalczyk, R.S.; Zeidman, B.; Thornton, S.T. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In order to perform experiment NE-1 and NE-5 at SLAC, it is necessary to construct a new focal-plane detector assembly for the 1.6-GeV spectrometer. The authors have been requested to provide a general-purpose system suitable or easily changed for detection of electrons or hadrons. In collaboration with the University of Virginia group, the authors are in the process of constructing the detector.

48423 (ANL—85-22, pp 38-39) **Weak magnetism effects in beta spectra.** Camp, J.; Garvey, G.T.; Wark, D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A flat-field beta spectrometer with active collimation and a 3-wire detector with ray-tracing capability to permit background rejection has been built. It is intended to use this system to observe the effect of weak magnetism on beta decay spectra. Previous experimental attempts to measure this effect have proven very difficult because of the small size of the effect, the order of 1% per MeV deviation from the allowed shape. The development of the spectrometer has involved two main thrusts. First, the wire detector requires 1% position resolution in 2 dimensions to be sensitive to multiple scattering and background events. Second, the low acceptance of the spectrometer necessitates very high target yields.

48424 (ANL—85-22, pp 105) **Development work on a Bragg curve spectrometer.** Vineyard, M.F.; Kovar, D.G.; Henderson, D.; Wilkins, B. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A large solid-angle Bragg Curve Spectrometer (BCS) is being developed for use on the new ATLAS scattering chamber which is presently being constructed. The detector which is of cylindrical design has an active area of approximately 300 cm^2 and active length of 27 cm. It is designed to be used with a position-sensitive Breakin detector trigger for experiments in good timing and a large solid angle is necessary. Several other groups have built small solid angle BCSs which provided excellent energy and good nuclear charge (Z) resolutions. In the coming year, the authors will test this detector to determine the feasibility of employing such a device with a large solid angle. If these tests are successful, the BCS will be used in conjunction with Breskin detectors to construct a TOF arm to measure evaporation residues in studies of complete and incomplete fusion reactions.

48425 (ANL—85-22, pp 105-106) **Development of a timing detector for the split-pole magnetic spectrograph.** Rehm, K.E.; van den Berg, A. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A parallel plate avalanche timing detector was built that covers the full length of the focal plane ionization chamber used for the study of heavy ion reactions with the magnetic spectrograph. With the energy loss signal ΔE, energy E, magnetic rigidity Bp and time-of-flight t, four measured quantities are now available to determine mass M, nuclear charge Z, atomic charge state q, and the Q-value of a binary nuclear reaction. The timing detector was tested with heavy ion beams of O, S and Ni and an intrinsic time resolution of 300 psec was achieved. This detector combination was successfully used in first experiments with Ni induced reactions at low incident energies where a unique mass identification was previouly not possible.

48426 (ANL—85-22, pp 106) **Superconducting solenoid lens electron spectrometer.** Daly, P.J.; Grabowski, Z.W.; Trazaska, W.; Nielsen, R.; Janssens, R.V.F.; Khoo, T.L. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Work has continued on the construction of the Purdue superconducting electron spectrometer to be installed at the linac. Studies of the problems associated with background in the electron spectra have been completed with a Gerholm-type normal-conducting electron-lens spectrometer on loan from Oak Ridge National Laboratory. This lens has also been used for an experiment where conversion electron-lens in the decay of isomers in ^{150}Er were measured. Meanwhile, at Purdue, the design of the superconducting spectrometer assembly has been completed and construction and final assembly are well underway. Initial tests of the system will be performed at the 6 MV tandem facility of Purdue University. The spectrometer will subsequently be installed at its final location at the linac.

48427 (ANL—85-22, pp 106-107) **Unfolding program for gamma-ray spectra.** Radford, D.C.; Ahmad, I.; Holzmann, R.; Janssens, R.V.F.; Khoo, T.L. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In the study of γ-ray spectra measured by NaI(Tl) or Ge detectors, the response of the detectors has to be taken into account before information can be obtained about total intensities of a continuous spectrum or spectral shape, for example. For a monoenergetic gamma-ray, the measured spectrum can be divided between a photopeak centered at the nominal energy and a continuous background corresponding to incomplete energy collection (due to Compton scattering and other processes). This problem is of particular importance in studies of the quasicontinuum γ-ray spectrum emitted in (H.I., xn) reactions. An unfolding program has been developed and has been successfully utilized in the analysis of NaI and Compton-suppressed Ge spectra. The method developed here utilizes spectra obtained with the detectors of interest for radioactive sources of monoenergetic γ-rays located at the target position.

48428 (ANL—85-22, pp 107-108) **Development of a particle-electron coincidence setup.** van den Berg, A.M.; Janssens, R.V.F.; Rehm, K.E. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Study of heavy nuclei using conventional (HI, xnγ) reactions is hampered by a high γ-ray yield from fission products and relatively large conversion coefficients for transitions in rotational bands. A natural way to overcome these problems is the use of an electron spectrometer for the detection of conversion electrons. Advantages of such an apparatus are: 1) possibility of high detection efficiency (10-15%) which allows for relatively low beam currents, 2) Z-identification, and 3) the measurement of converted EO transitions. In order to get an almost unambiguous identification of the decaying nucleus formed in a binary heavy ion reaction the authors use the Enge split-pole spectrograph to identify the projectile-like particle.

48429 (ANL—85-22, pp 108) **Development and testing of an air-core superconducting solenoid for measurements on the linac.** Becchetti, F.; Casey, T.; Janecke, J.; Lister, P.; Stern, R.; Kovar, D.G.; Janssens, R.V.F.; Pardo, R.; Vineyard, M.F.; Kolata, J.J. (Univ. of Michigan, Ann Arbor). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A 20 cm diameter x 40 cm long superconducting solenoid spectrometer (B = 3.5 T, E < 20q^2/A) was assembled and tested on the user beam line associated with the Linac. The device, which acts as a simple lens, consists of an air-core solenoid, small scattering chamber, a set of movable apertures, and a detector chamber. The flight path is about 2 meters with an angular opening of 4-8 degrees and a solid angle of 20- 60 msr. The imaging properties were established using beams of ^{16}O and ^{32}S, together with alpha sources. Both plastic track detectors and a gas position-sensitive detector backed by a Si detector were used.

48430 (ANL—85-22, pp 109) **Split-pole spectrograph in the new ATLAS target area.** Rehm, K.E. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Due to its low dispersion the Enge split-pole magnetic spectrograph is a nearly ideal tool to study heavy ion induced reactions at energies of a few MeV per nucleon which are available in the new ATLAS area. The authors have therefore moved the split-pole spectrograph located in the old tandem area into the new ATLAS experimental area. The magnet has been aligned and first measurements show that there is no appreciable movement of the floor during rotation of the magnet. Utilities have been installed and the vacuum system is now being assembled. The system should be ready for data taking when the first beams from the ATLAS accelerator become available.

48431 (ANL—85-22, pp 109-110) **Construction of a gamma-ray facility for ATLAS.** Janssens, R.V.F.; Khoo, T.L.; Radford, D.C.; Holzmann, R.; Garg, U.; Drigert, M.W.; Funk, E.; Kolata, J.J.; Mihelich, J.M. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A gamma-ray facility consisting of (a) a 4π gamma-sum/multiplicity spectrometer with 50-56 hexagonal BGO elements and (b) 10-12 Compton-Suppressed Spectrometers (CSS) external to the hexagonal elements is currently under construction. The instrument is expected to have a powerful impact on a large class of experiments in heavy-ion research ranging from gamma-ray spectroscopy studies of great detail to the investigation of reaction mechanisms.

48432 (ANL—85-22, pp 110-111) **Results from the prototype BGO Compton-Suppression Shields for the γ-ray facility for ATLAS.** Janssens, R.V.F.; Khoo, T.L.; Ahmad, I.; Holzmann, R.; Radford, D.C.; Garg, U.; Drigert, M.W.; Funk, E.G.; Kolata, J.J.; Michelich, J.M. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

For the new gamma-ray facility currently under construction for the ATLAS target area prototype BGO elements were acquired and the evaluation of prototype GBO Compton-Suppression Shields has been completed. Shields were obtained from two manufacturers. Extensive tests were performed with radioactive sources as well as with γ-rays produced with nuclear reactions. The overall performance of the shield is very satisfactory, being quite close to that expected on the basis of Monte Carlo calculations.

48433 (ANL—85-22, pp 111-112) **Tests of prototype hexagon BGO detectors for the inner array of the γ-ray facility for ATLAS.** Garg, U.; Drigert, M.W.; Funk, E.G.; Kolata, J.J.; Mihelich, J.M.; Janssens, R.V.F.; Khoo, T.L. (Univ. of Notre Dame, South Bend, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

BGO detectors of hexagonal shape are planned for use in the inner array of the γ-ray facility currently under construction for ATLAS. Here, the results of tests performed on prototype detectors are reported. Four crystals obtained from the different manufacturers were tested for energy resolution, timing resolution and light collection efficiency.

48434 (ANL—85-22, pp 225-227) **Development of a multiparticle imaging detector.** Breskin, A.; Faibis, A.; Kanter, E.P.; Koenig, W.; Vager, Z.; Zabransky, B.J. (Weizmann Institute, Rehovoth, Israel). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

It has long been recognized that Coulomb explosion techniques offer a potentially very powerful means of directly determining the geometries of individual molecules contained in a beam. Unfortunately, there have been considerable technical difficulties in performing such measurements in all but a few very selective cases. Recently, due to advances in detector technology by nuclear and particle physicists, a new generation of low-pressure multiwire avalanche counters has been developed capable of overcoming these difficulties. Specifically, these counters can now image multiparticle events in three dimensions so that it is possible to uniquely determine the final trajectories for ALL fragments from a Coulomb-exploding cluster. The authors have designed and constructed such a detector this year consisting of five planes of wires. Its design and performance are described.

48435 **(ANL-HEP-CP—86-32) First events and prospects at the Fermilab collider.** Binkley, M. (Fermi National Accelerator Lab., Batavia, IL (USA)). Mar 1986. Contract W-31-109-ENG-38. 21p. (CONF-860150—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014604.

From Winter condensed matter physics conference: frontiers in condensed matter X-ray physics; Aspen, CO, USA (12 Jan 1986).

A brief description of the Collider Detector at Fermilab (CDF) is given including the detector components and the data acquisition system. The first test run, the first events, and the performance of the detector are discussed. Finally the prospects for future running are reviewed.

48436 **(ANL-HEP-CP—86-40) Status of the Soudan 2 nucleon decay experiment.** May, E.N. (Argonne National Lab., IL (USA)). Jun 1986. Contract W-31-109-ENG-38. 4p. (CONF-860575—36). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014585.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

Soudan 2 is an 1100-ton fine-grained tracking calorimeter now being constructed to search for nucleon decay. It is distinguished by superior background rejection for a wide variety of decay modes and by a trigger threshold low enough for 100 MeV neutrino-induced muons. A new laboratory large enough for an eventual 3300 ton experiment has been constructed in Minnesota's Soudan mine at a depth equivalent to 2200 meters of water. The detector will be assembled from 256 5-ton calorimeter modules, utilizing corrugated steel sheets and plastic drift tubes to obtain a rather isotropic honeycomb geometry. Data collection will begin in the fall of 1986 and assembly of the 1100 tons will be completed in 1988. Installation progress and the performance of the first 5-ton modules will be described. 3 refs., 1 fig.

48437 **(BNL—38229) Large solid angle tracking of Monte Carlo events of heavy ion collisions in TPC magnetic spectrometers.** Lindenbaum, S.J.; Etkin, A.; Foley, K.J.; Hackenburg, R.W.; Longacre, R.S.; Love, W.A.; Morris, T.W.; Platner, E.D.; Saulys, A.C.; Asoka-Kumar, P.P.V. (Brookhaven National Lab., Upton, NY (USA); City Coll., New York (USA)). 1986. Contract AC02-76CH00016. 12p. (CONF-860441—4). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014137.

From 5. international conference on ultra-relativistic nucleus-nucleus collisions (Quark Matter '86); Pacific Grove, CA, USA (13 Apr 1986).

The collision of 15 GeV/nucleon sulfur and carbon or oxygen ions with various fixed targets such as carbon, sulfur, and gold is to be observed in the MPS magnetic spectrometer with a time projection chamber (TPC) module. This TPC will be placed just downstream of the target and be able to track approximately 50% of all charged particles. The design and construction of the TPC is proceeding, and prototypes of the TPC readout system have been tested and production devices are to be delivered. A TPC track reconstruction program has been developed. Monte Carlo events have been generated and tracked. The track reconstruction program consists of three parts: a local pattern recognition which associates contiguous readouts on adjacent readout wires to form a single hit; a subroutine which positions the hits into slices in the vertical plane; and the track reconstruction section. (LEW)

48438 **(CEA-CONF—8003) RF sputtered Ce^{+3} activated SiO_2 glass films as scintillators for alpha particles detection.** Sella, C.; Heindl, R.; Robert, A. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Recherche Technologique et de Developpement Industriel (IRDI)). May 1985. 5p. (CONF-850532—1). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750850.

From International conference on ion and plasma assisted techniques; Munich, F.R. Germany (14 May 1985).

A new selective scintillator based on the use of Ce^{3+} doped glass layer with thickness ranging from 10 to 40 nm has been developed. These films are deposited by RF reactive sputtering on the entry window of a photomultiplier.

48439 (CONF-841187—Vol.2, pp 637-642) **Los Alamos National Laboratory's environmental surveillance and radiological emergency vehicle and the Co-60 incident.** Van Etten, D.M.; Ahlquist, A.J.; Hansen, W.R. (Los Alamos National Lab., NM). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A 4-wheel drive van has been outfitted at Los Alamos for environmental surveillance and radiological emergencies. The van's capabilities were described at this conference in 1982. The rapid gamma search and spectral analysis capabilities were utilized in conjunction with the cobalt-60 (^{60}Co) teletherapy source incident in Juarez, Mexico. Assistance was requested by the State of New Mexico (through DOE/Albuquerque Area Office) in January 1984 to perform initial in-situ isotopic identification of the contaminated steel that was first discovered in the United States by Low Alamos. The van's capabilities were again called upon in March 1984 to survey the New Mexico highways using the highly sensitive delta count rate monitoring system for ^{60}Co pellets that may have been tracked into the state. This paper provides 1) setup and results of the surveys conducted with the van, 2) interactions with the press, and 3) an evaluation of the van's usefulness in such an emergency response.

48440 **(CONF-8604103—1) CCD-based parallel detection system for electron energy-loss spectrometry and imaging.** Strauss, M.G.; Naday, I.; Sherman, I.S.; Zaluzec, N.J. (Argonne National Lab., IL (USA)). Apr 1986. Contract W-31-109-ENG-38. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014579.

From Conference on frontiers of electron microscopy in materials science; Argonne, IL, USA (21 Apr 1986).

A generic, 2-dimensional integrating detector based on a charge-coupled device (CCD) is being developed for applications in physical and biomedical research. A detector system, operating in a 1-dimensional mode, is currently being designed for electron energy-loss spectroscopy (EELS); when operated in a 2-dimensional mode it is suitable for electron imaging studies. An energy-loss spectrometer (Gatan 607) is being equipped with a magnifying quadrupole electron lens to produce an electron dispersion of ~15 mm on a YAG:Ce scintillator. The scintillation light is coupled via an optical lens system to a 512 pixel x 512 pixel CCD. Energy-loss spectra are recorded successively in 5 pixel x 512 pixel frames. With a microscope beam current of 0.5 nAmp and electron energy of 120 keV, the integration (exposure) time for 100 frames is 40 msec and the readout and digitization time for 100 frames, using a 14-bit ADC, is 0.5 sec. The statistical precision expected by summing the 100 frames in the computer is 10^{-4} for the zero-loss peak (DQE = 0.4). For a peak of 1/1000 the intensity of the zero-loss peak, the precision is 10^{-2} (DQE = 0.2). To obtain the same precision (10^{-2}) with a 512-pixel linear photodiode array would require data from at least 280 frames and an acquisition time 35 to 70 times longer than the 40 msec required for the exposure of 100 frames in the CCD.

48441 **(ECN—181) International comparison of interpolation procedures for the efficiency of germanium gamma-ray spectrometers (GAM83 exercise).** Zijp, W.L.; Polle, A.N.; Nolthenius, H.J. (Netherlands Energy Research Foundation, Petten). Jan 1986. 83p. (ICRM-S—13). NTIS (US Sales Only), PC A05/MF A01. File Number DE86703197.

Results are presented for the outcome of an international intercomparison of a particular gamma-ray spectrometric procedure. Laboratories were asked to determine full energy peak efficiencies and activities by means of their own procedures, starting from supplied peak-efficiency data. Four data sets for four different conditions of germanium detectors were distributed. The sets comprised: a high accuracy- (uncertainty > 1%) data set with a relatively large number of measured data (SET 1); a low accuracy- (uncertainty 3-5%) data set with a relatively small number of measured data (SET 2); a low energy-data set (SET 3); a high accuracy-data set with a relatively small number of measured data (SET 4). The intercomparison (coded GAM83) was organized and analyzed under auspices of the International Committee for Radionuclide Metrology (ICRM). The results comprise the analysis of the contributions of 41 participants. 40 figs.; 32 refs.; 19 tables.

48442 **(EGG-M—08185) Nuclide activities determined from gamma-ray spectra from Ge detectors: a review with GAUSS VIII as the example.** Helmer, R.G.; Putnam, M.H.; McCullagh, C.M. (EG and G Idaho, Inc., Idaho Falls (USA)). 1985. Contract AC07-76ID01570. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013341.

Various features are described that are useful in a general-purpose computer program to analyze gamma spectra from Ge detectors. An INEL code, GAUSS VIII, is used as an example of such a program. The discussion assumes that the goal of the analysis is to determine the activities of the nuclides present for a number of spectra (i.e., production analysis) and that no specialized treatment is given to any particular spectrum. 17 refs., 7 figs., 1 tab.

48443 **(FRNC-TH—2160) New development of holography in particle detectors: application to bubble chambers and streamer chambers.** Wiatrowski, E. (Paris-11 Univ., 91 - Orsay (France)). 1983. 210p. (In French). NTIS (US Sales Only), PC A10/MF A01. File Number DE86750851.

This thesis describes the contribution of holography in two particle detectors well used in high energy physics. A first part presents the possibilities of a double beam holographic set up with diffuse illumination in the case of large scale bubble chamber (more than 1000 litres). The second part introduces the results obtained by the use of an in-line holographic recording in a streamer chamber (a streamer is the electroluminescent state of an electronic avalanche). In both cases, the new possibilities offered by these developments are discussed (resolution and depth of field of holographic images).

48444 **(INIS-mf—10173) Wire chamber conference.** Bartl, W.; Neuhofer, G.; Regler, M. (eds.). (Technische Univ., Vienna (Austria)). Feb 1986. 93p. (CONF-860272—Absts.). NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196.

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

This booklet contains program and the abstracts of the papers presented at the conference, most of them dealing with performance testing of various types of wire chambers. The publication of proceedings is planned as a special issue of 'Nuclear instruments and methods' later on. All abstracts are in English. An author index for the book of abstracts is given.

48445 (INIS-mf—10173, pp 27) **Parallel electrode position sensitive detector system for high counting rates.** Hendrix, J. (European Molecular Biology Laboratory, Hamburg, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48446 (INIS-mf—10173, pp 25) **Detection of high energy cosmic nuclei on the space shuttle.** Mueller, D. (Chicago Univ., IL, USA. Enrico Fermi Inst.; Chicago Univ., IL, USA. Dept. of Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48447 (INIS-mf—10173, pp 25) **Use of wire chambers in structural biology.** Schoenborn, B.P.; Schefer, J.; Schneider, D.K. (Brookhaven National Lab., Upton, NY, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48448 (INIS-mf—10173, pp 26) **High count rate position-sensitive detectors for synchrotron radiation experiments.** Hasegawa, K.; Mochiki, K.; Koike, M.; Satow, Y.; Hashizume, H.; Iitaka, Y. (Tokyo Univ., Japan. Faculty of Engineering; KEK, Tsukuba, Japan; Tokyo Inst. of Tech., Japan; Tokyo Univ., Japan. Faculty of Pharmaceutical Sciences). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48449 (INIS-mf—10173, pp 28) **Pulse shape analysis for a jet chamber with long drift path in the presence of magnetic fields.** Mayer, H.-J.; Bittner, S.; Ludwig, J.; Sverko, I.; Weltin, A.; Schaile, D.; Schaile, O. (Freiburg Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48450 (INIS-mf—10173, pp 28) **OPAL jet chamber full size prototype.** Schaile, D. (Freiburg Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48451 (INIS-mf—10173, pp 29) **Time expansion chamber as vertex detector for experiment MARK J at DESY.** Viertel, G. (Eidgenoessische Technische Hochschule, Zurich, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48452 (INIS-mf—10173, pp 30) **New drift chamber for the Mark II detector at the SLAC linear collider.** Hanson, G.G. (SLAC Stanford, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48453 (INIS-mf—10173, pp 31) **Modular multidrift vertex detector.** Sauli, F.; Bouclier, R.; Charpak, G.; Mine, P.; Peisert, A.; Ropelewski, L.; Santiard, J.C.; Solomey, N. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48454 (INIS-mf—10173, pp 31) **Induction drift chamber.** Roderburg, E.; Baecker, A.; Krieger, H.; Mattern, D.; Walenta, A.H. (Siegen Univ., Gesamthochschule, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48455 (INIS-mf—10173, pp 32) **Detection of charged particles in amorphous silicon layers.** Perez-Mendez, V.; Kaplan, S.N.; Morel, J.; Street, R.; Ward, W. (Lawrence Berkeley Lab., CA, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48456 (INIS-mf—10173, pp 32) **Multisectional wire chamber for investigation of impulse X-ray and VUV plasma radiation.** Peskov, V.D. (Institute for Physical Problems, Moscow, USSR). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48457 (INIS-mf—10173, pp 34) **Results from half-scale DELPHI TPC prototype tests.** Vilanova, D. (CERN-College de France-orsay-Saclay, France). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48458 (INIS-mf—10173, pp 35) **Measurement of avalanche broadening caused by the wire E x B effect.** Blum, W.; Stiegler, U.; Gondolo, P.; Rolandi, L. (Max-Planck Institut, Muenchen, Germany, F.R.; Trieste Univ., Italy; Istituto Nazionale di Fisica Nucleare, Trieste, Italy). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48459 (INIS-mf—10173, pp 38) **Experience with the ASTERIX spiral projection chamber at LEAR.** Gastaldi, U. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48460 (INIS-mf—10173, pp 39) **Electron identification up to 100 GeV by means of transition radiation.** Nann, S.; Butt, H.J.; Koppitz, B.; Staa, R. van. (Hamburg Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48461 (INIS-mf—10173, pp 39) **Drift chamber for CMD-2 detector at VEPP-2M.** Khazin, B.I.; Aulchenko, V.M.; Snopkov, I.G.; Solodov, E.P. (Inst. of Nuclear Physics, Novosibirsk, USSR). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48462 (INIS-mf—10173, pp 40) **Time projection chambers and similar devices.** Nygren, D.R. (Lawrence Berkeley Lab., CA, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48463 (INIS-mf—10173, pp 40) **Detector calibration and alignment with lasers.** Hilke, H.J. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48464 (INIS-mf—10173, pp 41) **Tracking systems of the collider detector at Fermilab.** Atac, M. (FNAL Batavia, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48465 (INIS-mf—10173, pp 42) **Target calorimeter and its streamer tube system of the CHARM II calorimeter.** Flegel, W. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48466 (INIS-mf—10173, pp 42) **Uranium sampling calorimetry with gas chamber readout.** Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48467 (INIS-mf—10173, pp 43) **Calorimeters: comparison between gaseous readout techniques and alternatives.** Fabjan, C. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48468 (INIS-mf—10173, pp 43) **Development of calorimeters using thin chambers operating in a high gain mode.** Mikenberg, G. (Weizmann Inst. of Science, Rehovoth, Israel. Dept. of Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48469 (INIS-mf—10173, pp 44) **New high gain thin gap detectors for the OPAL hadron calorimeter.** Bella, G. (Tel Aviv Univ., Israel. Dept. of Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48470 (INIS-mf—10173, pp 44) **Use of laser soldering for the construction of thin chambers.** Zwang, N. (Weizmann Inst. of Science, Rehovoth, Israel. Dept. of Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48471 (INIS-mf—10173, pp 45) **Development of high pressure proportional counters.** Baksay, L.; Schick, L.; Nemethy, P.; Oddone, P. (Union Coll., Schenectady, NY, USA; New York Univ., NY, USA; Lawrence Berkeley Lab., CA, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48472 (INIS-mf—10173, pp 46) **X-ray position detection in the region of 5 microns RMS with wire proportional chambers.** Smith, G.C.; Fischer, J.; Radeka, V. (Brookhaven National Lab., Upton, NY, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48473 (INIS-mf—10173, pp 47) **Possible application of low-pressure multistep detectors to dE/dX measurements via single cluster counting.** Breskin, A.; Chechik, R. (Weizmann Inst. of Science, Rehovoth, Israel. Dept. of Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48474 (INIS-mf—10173, pp 47) **Two-step parallel plate counter with a germanium anode and a two-dimensional readout for the detection of MIP.** Bellazzini, R.; Betti, C.; Brez, A.; Carboni, E.; Massai, M.M.; Torquati, M.R. (Istituto Nazionale di Fisica Nucleare, Pisa, Italy). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48475 (INIS-mf—10173, pp 48) **Transition radiation detectors and particle identification.** Dolgoshein, B. (Inst. of Eng. Physics, Moscow, USSR). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48476 (INIS-mf—10173, pp 48) **Microstrip vertex detector for E687 experiment at Tevatron.** Moroni, L.; Bellini, G.; Giammarchi, M.; Manfredi, P.F.; Menasce, D.; Pedrini, D.; Sala, S.; Vittone, M. (Istituto Nazionale di Fisica Nucleare, Milan, Italy). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48477 (INIS-mf—10173, pp 49) **Microvertex detector - present trends and future perspectives.** Manfredi, P.F.; Ragusa, F. (Istituto Nazionale di Fisica Nucleare, Milan, Italy). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48478 (INIS-mf—10173, pp 51) **Ring imaging Cherenkov technique and the MWPC as a photoelectron detector.** Seguinot, J. (College de France, 75 - Paris). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48479 (INIS-mf—10173, pp 51) **Drift chambers with delay line readout operated in the limited streamer mode.** Poiret, C.; DeClercq, C.; Etienne, L. (Univ. de L'Etat, Mons, Belgium). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48480 (INIS-mf—10173, pp 52) **Tests of gas mixtures for operating drift chambers in limited streamer mode over drift distances up to 10 cms.** Daubie, E.; Defontaine, F.; Grard, F.; Kesteman, J.; Pingot, O.; Poiret, C.; Etienne, L.; Van Doninck, W. (Universite de L'Etat, Mons, Belgium; Inter University Institute for High Energies, Brussels, Belgium). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48481 (INIS-mf—10173, pp 52) **Strip chamber using tetramethylsilane.** Engler, J.; Keim, H.; Mueller, C. (Kernforschungszentrum Karlsruhe G.m.b.H., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48482 (INIS-mf—10173, pp 55) **Electron attachment of C_5F_{12} to be used as gas radiator in the BARREL RICH detector of DELPHI.** Klempt, W.; Fraisard, D.; Haider, S.; Hofmann, H.; Rosso, E.; Soria, D.; Jansen, H. (European Organization for Nuclear Research, Geneva, Switzerland; Nationaal Inst. voor Kernfysica en Hoge-Energiefysica, NIKHEF, Amsterdam, Netherlands). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48483 (INIS-mf—10173, pp 55) **Fastbus time digitizer for LEP detectors.** Vanuxem, J.P. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48484 (INIS-mf—10173, pp 56) **Comparison of the charge division and timing difference techniques in streamer mode.** Biagi, S.F.; Booth, P.S.L. (Liverpool Univ., UK). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48485 (INIS-mf—10173, pp 56) **High accuracy measurments of drift time in the streamer mode.** Biagi, S.F.; Booth, P.S.L. (Liverpool Univ., UK). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48486 (INIS-mf—10173, pp 57) **Multiwire proportional chamber based system for digitizing electrophoretic gels.** Lillberg, J.W.; Kinnison, W.W.; McKee, R.J.; Anderson, H.L. (Los Alamos National Lab., NM, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48487 (INIS-mf—10173, pp 58) **Aromatic seeding agents for laser ionization in counting gases.** Schluepmann, J.; Bamberger, A.; Isele, R.; Stegle, M. (Freiburg Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48488 (INIS-mf—10173, pp 59) **Room temperature liquid ionization chambers using tetramethylsilane.** Ochsenbein, S.; Egger, J.; Kaspar, H. (Schweizerisches Inst. fuer Nuklearforschung, Villigen). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48489 (INIS-mf—10173, pp 60) **Studies of wire gain and track distortion near the sector edges of the ALEPH time projection chamber.** Muller, D.; Jared, R.; Love, J.; Wicklund, E. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48490 (INIS-mf—10173, pp 61) **UV laser ionization in organic vapours added to proportional chamber gases.** Hubricht, G.; Kleinknecht, K.; Moeller, C.; Mueller, E.; Pollmann, D.; Schmitz, K. (Dortmund Univ., Germany, F.R. Abt. Physik). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48491 (INIS-mf—10173, pp 61) **Results of a 100 MHz FADC system built in fastbus used by the UA2 vertex detector.** Plothow-Besch, H. (Heidelberg Univ., Germany, F.R. Inst. fuer Hochenergiephysik). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48492 (INIS-mf—10173, pp 62) **Identification of the trace impurities responsible for laser induced ionisation in proportional counters.** Raine, C.; Ledingham, K.W.D.; Smith, K.M.; Smyth, M.H.C.; Stewart, D.T.; Towrie, M.; Houston, C.M. (Glasgow Univ., UK. Dept. of Natural Philosophy; Glasgow Univ., UK. Dept. of Chemistry). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48493 (INIS-mf—10173, pp 63) **Response of streamer tubes to 210 GeV/c hadronic showers.** Boer, W. de; D'Agostini, G.; Stella, B. (Max-Planck Institut, Muenchen, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48494 (INIS-mf—10173, pp 63) **Spatial resolution of streamer tubes with analog read-out of transverse strips.** D'Agostini, G.; Stella, B.; Boer, W. de. (Istituto Nazionale di Fisica Nucleare, Rome, Italy; Max-Planck Institut, Muenchen, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48495 (INIS-mf—10173, pp 64) **ARGUS vertex drift chamber.** Kapitza, H.; Edwards, K.W.; Frisken, W.R.; Gilkinson, D.J.; Kutschke, R.; MacFarlane, D.B.; Padley, P.B.; Yoon, T.S.; Yun, J.C. (DESY Hamburg, Germany, F.R.; Institute for Particle Physics, Canada). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48496 (INIS-mf—10173, pp 64) **New techniques for drift-chambers.** Hamann, N.; Dutty, W.; Franz, J.; Peschina, R.; Roessle, E.; Schledermann, H.; Schmitt, H. (Freiburg Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48497 (INIS-mf—10173, pp 65) **Investigation of the space-time correlation for inclined tracks in drift chambers.** Hamann, N.; Dutty, W.; Franz, J.; Ulmer, H.G.; Roessle, E.; Schledermann, H.; Schmitt, H. (Freiburg Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48498 (INIS-mf—10173, pp 65) **Stack of bidimentional MWPCs using analogue read-out as a part of an electromagnetic calorimeter.** Chemarin, M.; Brom, J.M.; Escoubes, B.; Fay, J.; Kylling, A.; Larsen, B.; Mouellic, B.; Pia, M.G.; Santiard, J.C. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48499 (INIS-mf—10173, pp 66) **Production and tests of gas tube chambers for the endcaps of the L3 uranium hadron calorimeter.** Chendvankar, S.; Karpinski, W.; Luebelsmeyer, K.; Malhotra, P.; Niessen, L.; Pandoulas, D.; Siedling, R.; Sudhakar, K.; Wallraff, W. (Technische Hochschule Aachen, Germany, F.R. Lehrstuhl fuer Experimentalphysik 1A und 1. Physikalisches Inst.; Tata Inst. of Fundamental Research, Bombay, India). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48500 (INIS-mf—10173, pp 66) **Design and tests of the DELPHI inner detector.** Udo, F.; Hartjes, F.; Timmermans, J.; Zonjee, N. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica, NIKHEF, Amsterdam, Netherlands. Sectie H). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48501 (INIS-mf—10173, pp 67) **Simple amplifier shaper-combination with tail suppression for analog MWPC signal processing.** Cattai, A.; Fischer, H.G.; Legrand, J.C.; Panter, M.; Ullaland, O. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48502 (INIS-mf—10173, pp 67) **Time digitizer in fastbus version without interpolator.** Pernicka, M.; Schmid, S. (Institut fuer Hochenergiephysik, Vienna, Austria). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48503 (INIS-mf—10173, pp 68) **Operation of RICH single-photon detectors, with optically shielded wires, in transverse magnetic fields.** Lund-Jensen, B.; Eek, L.O.; Ekeloef, T.; Fransson, K.; Hallgren, A.; Dulinski, W.; Kostarakis, P.; Lenzen, G. (Uppsala Univ., Sweden; CRN Strasbourg, France; European Organization for Nuclear Research, Geneva, Switzerland; Wuppertal Univ., Gesamthochschule, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48504 (INIS-mf—10173, pp 68) **Proportional counter in a portable energy dispersive X-ray analyzer.** Sipilae, H. (Outokumpu Electronics, Espoo, Finland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48505 (INIS-mf—10173, pp 70) **Signal propagation in multiwire chambers.** Bock, P.; Russ, M. (Heidelberg Univ., Germany, F.R. Physikalisches Inst.; Rhodes Univ., Grahamstown, South Africa. Dept. of Physics and Electronics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48506 (INIS-mf—10173, pp 71) **Performance of a prototype radial-drift chamber with logarithmic potential-division.** Miller, D.J.; Anderson, B.; Attree, D.; Charalambous, A.; Hobson, P.R.; Roberts, I. (Birkbeck Coll., London, UK). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48507 (INIS-mf—10173, pp 71) **Influence of the cathode on the neutralization of complex ions in proportional counters and MWPC's.** Ostrowski, K.W.; Kowalski, T.Z.; Zajac, J. (Institute of Physics and Nuclear Techniques, Krakow, Poland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48508 (INIS-mf—10173, pp 72) **Digitizer of the ALEPH electromagnetic calorimeter.** Renardy, J.F. (Centre d'Etudes Nucleaires de Saclay, France). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48509 (INIS-mf—10173, pp 72) **Large area transition radiation detector for electron identification of the UA-6 experiment.** Vacchi, A. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48510 (INIS-mf—10173, pp 73) **Track finding with the Mark II/SLC drift chamber.** Weinstein, A.; Perl, J.; Schwartz, A.; Seiden, A. (California Univ., Santa Cruz, USA. Inst. for Particle Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48511 (INIS-mf—10173, pp 74) **Investigation of breakdown conditions in drift chambers.** Sadrozinski, H.; Guibellino, P.; Rowe, W.; Skala, J. (California Univ., Santa Cruz, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48512 (INIS-mf—10173, pp 74) **Proportional chambers with delay line readout in the MD-1 detector.** Panin, V.S.; Bondar, A.E.; Zhilich, V.N.; Minakov, G.D.; Onuchin, A.P.; Rodyakin, V.A.; Telnov, V.I.; Filimonov, G.S. (Inst. of Nuclear Physics Novosibirsk, USSR). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48513 (INIS-mf—10173, pp 75) **Construction and behaviour of a miniature drift chamber.** Wirth, H.; Eyrich, W.; Hofmann, A.; Muehldorfer, B.; Ortner, H.-W.; Schloesser, H. (Erlangen-Nuernberg Univ., Erlangen, Germany, F.R. Physikalisches Inst.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48514 (INIS-mf—10173, pp 76) **Derandomizing buffer and microcomputer memory make a fast MWPC image memory.** Skvaril, J. (Nuclear Research Institute, Rez, Czechoslovakia). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48515 (INIS-mf—10173, pp 76) **Application of wire chambers in Moessbauer spectroscopy.** Zhu, Jun Jie; Zhang, Yi Qun. (Univ. of Science and Technology of China, Hefei, Anhui, China). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48516 (INIS-mf—10173, pp A10) **Localization properties of a large current mode chamber for Cherenkov radiation photons detection.** Derevshikov, A.A. (Inst. for High Energy Physics, Serpuklov, USSR). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48517 (INIS-mf—10173, pp B11) **On the possibility of the new-type coordinate sensitive detector construction.** Asatiani, T.L. (Academy Sci. Cermenian, USSR. Yerevan Physic Inst.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48518 (INIS-mf—10173, pp 29) **Performance of the SLD central drift chamber prototype.** Atwood, W.B.; Carr, J.; Chadwick, G. (Stanford Linear Accelerator Center, Menlo Park, CA, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48519 (INIS-mf—10173, pp 30) **Prototype results of a high resolution vertex drift chamber for the Mark-II SLC upgrade detector.** Hayes, K.; Alexander, J.; Drell, P. (Stanford Linear Accelerator Center, Menlo Park, CA, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48520 (INIS-mf—10173, pp 32) **Micro vertex detector for experiment UA1 at the CERN P P-bar collider.** Mueller, T.; Bassi, L.; Cennini, P. (Siegen Univ., Gesamthochschule, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48521 (INIS-mf—10173, pp 33) **Gas scintillation proportional counter for K X-ray experiments at LEAR.** Okx, W.J.C.; Eijk, C.W.E. van; Hollander, R.W. (Technische Hogeschool Delft, Netherlands). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48522 (INIS-mf—10173, pp 34) **TPC90, a test model for the ALEPH time projection chamber.** Witzeling, W.; Amendolia, S.R.; Benetta, R. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48523 (INIS-mf—10173, pp 35) **Gating by positive ion trapping in a time projection chamber.** Jared, R.C.; Amendolia, S.R.; Binder, M. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48524 (INIS-mf—10173, pp 36) **Dependence of the transverse diffusion on magnetic and electric fields.** Richstein, J.; Amendolia, S.R.; Blum, W. (Dortmund Univ., Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48525 (INIS-mf—10173, pp 37) **TOPAZ time projection chamber.** Kamae, T.; Aihara, H.; Enomoto, R. (Tokyo Univ., Japan). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48526 (INIS-mf—10173, pp 37) **Performance of the TOPAZ-TPC sector.** Aihara, H.; Enomoto, R.; Fujii, H.; DuBois, A.; Jared, R.C.; Kirsten, F. (Tokyo Univ., Japan. Dept. of Physics). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48527 (INIS-mf—10173, pp 38) **High density spiral projection chamber (HDSPC): design of the end-cap detectors of the proposed OBELIX experiment at LEAR.** Gastaldi, U.; Bussa, M.P.; Busso, L. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48528 (INIS-mf—10173, pp 41) **CDF end plug e,m, calorimeter calibration and monitoring.** Mishina, M.; Fukui, Y.; Hayashide, Y.; Kanda, S.; Shibata, M.; Muraki, Y. (KEK Ibraki-ken, Japan; Tsukuba Univ., Sakura, Ibaraki, Japan). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48529 (INIS-mf—10173, pp 45) **Cathode readout MWPC as detector for TPC type RICH counters.** Dulinski, W.; Eek, L.O.; Ekelof, T. (Strasbourg-1 Univ., 67, France. Centre de Recherches Nucleaires). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48530 (INIS-mf—10173, pp 46) **Multielement proportional chamber for ^{136}Xe $\beta\beta$ decay.** Camin, D.; Alessandrello, A.; Bellotti, E. (Istituto Nazionale di Fisica Nucleare, Milan, Italy). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48531 (INIS-mf—10173, pp 49) **Performance of a novel silicon pad detector.** Tschulik, A.; Beuttenmueller, R.H.; Chesi, E. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48532 (INIS-mf—10173, pp 50) **L3 high resolution multisampling drift chambers.** Graaf, H. van de; Becker, U.; Bing, J. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica, NIKHEF, Amsterdam, Netherlands. Sectie H). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48533 (INIS-mf—10173, pp 50) **Construction of the CLEO II drift chamber.** DeSalvo, R.; Cassel, D.G.; Dobbins, J. (Cornell Univ., Ithaca, NY, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48534 (INIS-mf—10173, pp 57) **Position sensitive silicon detectors inside the tevatron collider.** Bedeschi, F.; Belforte, S.; Bellettini, G.; Bertolucci, S.; Cordelli, M.; Curatolo, M.; Dulach, B.; Esposito, B.; Giromini, P. (Pisa Univ., Italy; Istituto Nazionale di Fisica Nucleare, Pisa, Italy). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48535 (INIS-mf—10173, pp 58) **High performance imaging drift chamber in a high rate fixed target experiment.** Piuz, F.; Bettoni, D.; Dederichs, K. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48536 (INIS-mf—10173, pp 59) **Design and tests of the Z-coordinate drift chamber system for the OPAL detector at LEP.** Mes, H.; Dixit, M.S.; Hargrove, C.K.; Godfrey, L.; Losty, M.J.; Oakham, G.K.; Carnegie, R.K.; Hemingway, R.J.; MacPherson, A.C.; Payne, R. (National Research Council of Canada, Ottawa, Ontario; Carleton Univ., Ottawa, Ontario, Canada). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48537 (INIS-mf—10173, pp 60) **ALEPH time projection chamber.** Thomas, J.; Amendolia, S.R.; Blum, W. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48538 (INIS-mf—10173, pp 69) **Drift-pots for small angle elastic scattering at the Fermilab tevatron.** Zucchelli, S.; Bertani, M.; Giacomelli, G.; Mondardini, M.; Amos, N.; DeSalvo, R.; Orear, J.; York, T.; Baker, W.; Eartly, D. (Bologna Univ., Italy; Cornell Univ., Ithaca, NY, USA). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48539 (INIS-mf—10173, pp 69) **Performance of a vertex drift chamber with controlled charge collection geometry.** Dederichs, K.H.; Bettoni, D.; En'yo, H. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48540 (INIS-mf—10173, pp 70) **Drift chamber read-out with 100 MHz flash ADCs.** Zimmer, M.; Bock, P.; Eckerlin, G. (Heidelberg Univ., Germany, F.R. Physikalisches Inst.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48541 (INIS-mf—10173, pp 73) **Design and rejection studies for a cylindrical transition radiation detector.** Fayard, L.; Ansari, R.; Chollet, J.-C. (Paris-11 Univ., 91 - Orsay, France. Lab. de l'Accelerateur Lineaire). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48542 (INIS-mf—10173, pp 75) **Test of a full scale sector for a 1 m long high resolution vertex chamber.** Hawelka, P.; Commichau, V.; Deutschmann, M. (Technische Hochschule Aachen, Germany, F.R. Lehrstuhl fuer Experimentalphysik 3B und 3. Physikalisches Inst.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48543 (INIS-mf—10174, pp XIII/77) **Concentration and microdistribution of U in the cathode of Fe-Cr alloy for the gas counter.** Kashkarov, L.L.; Fisenko, A.V. (AN SSSR, Moscow. Inst. Geokhimii i Analiticheskoj Khimii). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48544 (INIS-mf—10174, pp XVIII/111) **Fading independent measurement of low γ-doses in the environment with TL-dosimeters.** Sahre, P. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden, German Democratic Republic). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48545 (INIS-mf—10174, pp III/7) **On-line system for investigating rare spontaneous fission events.** Chepigin, V.I.; Abdullin, F.Sh.; Eremin, A.V.; Nagy, S.; Gorshkov, V.I.; Ter-Akopian, G.M. (Joint Inst. for Nuclear Research, Dubna, USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48546 (INIS-mf—10174, pp V/16) **Application of low-level gamma spectrometers constructed in CLRP for measurements of environmental samples and building materials.** Jagielak, J.; Woloszyn, Z.; Zawanowski, K.J. (Centralne Lab. Ochrony Radiologicznej, Warsaw, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48547 (INIS-mf—10174, pp IX/38) **NaI(Tl) triple-coincidence spectrometer for the detection of ^{26}Na in meteorites and some results of the Jilin chondrite.** Heusser, G. (Max-Planck-Institut fuer Kernphysik, Heidelberg, Germany, F.R.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48548 (INIS-mf—10174, pp X/48) **Internal pair production in alpha-decaying nuclei.** Stanicek, J.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48549 (INIS-mf—10174, pp X/49) **Measurement of electron capture to positron emission ratios in light and medium nuclides.** Sykora, I.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48550 (INIS-mf—10174, pp X/52) **Characteristics of low-level single and coincidence-anticoincidence gamma-ray spectrometers.** Durana, L.; Emrich, P.; Chudy, M.; Janik, R.; Jurina, V.; Povinec, P.; Stanicek, J.; Sivo, A.; Usacev, S. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48551 (INIS-mf—10174, pp X/53) **Application of CAMAC system with on-line minicomputer in gamma-ray spectrometry.** Szarka, J.; Janko, K. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48552 (INIS-mf—10174, pp X/54) **Low background beta-gamma-coincidence spectrometer.** Ivliev, A.I.; Alexeev, V.A.; Zhelyazkov, V.T.; Stefanov, G.I.; Lavrukhina, A.K. (AN SSSR, Moscow. Inst. Geokhimii i Analiticheskoj Khimii). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48553 (INIS-mf—10174, pp X/55) **Some experiences with a beta-gamma coincidence spectrometer.** Wirdzek, S. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48554 (INIS-mf—10174, pp XV/91) **Laboratory of routine alpha-spectrometry based on gridded ionisation chambers.** Saro, S.; Pikna, M. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48555 (INIS-mf—10174, pp XV/92) **Impulse ionization chamber for spectrometry of low-level alpha-activities and fission products.** Atanassov, D.; Dimchev, T. (National Laboratory for Metrology of Ionizing Radiations, Lovech, Bulgaria; Vissh Minno-Geolozhki Inst., Sofia, Bulgaria). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48556 (INIS-mf—10174, pp XV/93) **Shielding material for low-activity gamma-spectrometry.** Malatova, I.; Bucina, I.; Hulka, J.; Kolinsky, F.; Dolenek, J. (Institut Hygieny a Epidemiologie, Prague, Czechoslovakia; Vitkovicke Zelezarny Klementa Gottwalda, Ostrava, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48557 (INIS-mf—10174, pp XV/94) **Optimization of an anticompton spectrometer for the analysis of biological samples.** Klucke, H.; Beetz, J. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin, German Democratic Republic). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48558 (INIS-mf—10174, pp XVIII/109) **Sensitive monitoring of rented radioactive aerosols.** Malatova, I.; Bucina, I.; Mala, H.; Rulik, P.; Kuca, P.; Hodik, F.; Feik, K.; Sandrik, S. (Institut Hygieny a Epidemiologie, Prague, Czechoslovakia; Atomova Elektraren Bohunice, Jaslovske Bohunice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48559 **(INIS-mf—10174) Low radioactivities '85. (The 7th Nuclear Science Colloquium). Program and abstracts.** (Komenskeho Univ., Bratislava (Czechoslovakia). Matematicko-Fyzikalna Fakulta). 1985. 147p. (CONF-8510205—Absts.). NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198.

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

The conference proceedings contain 108 papers. The following topics are dealt with: accelerator mass spectroscopy, rare decays, underground laboratories, low level counting and spectroscopy, double beta-decay experiments, low level detectors, cosmogenic radionuclides and rare events, ^{14}C counting and applications, ^{3}H counting and hydrology applications, natural radioactivity in the environment, gaseous detectors, anthropogenic radionuclides and radioactivity in the environment.

48560 (INIS-mf—10174, pp IV/8) **10 years low level counting in the underground laboratory in Bern, Switzerland.** Loosli, H.H.; Moell, M.; Oeschger, H.; Schotterr, U. (Bern Univ., Switzerland. Physikalisches Inst.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48561 (INIS-mf—10174, pp IV/10) **Low backround underground laboratory for radiochemical research.** Surkov, Yu.A.; Sobornov, O.P. (AN SSSR, Moscow. Inst. Geokhimii i Analiticheskoj Khimii). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48562 (INIS-mf—10174, pp IV/11) **Preliminary results of the underground laboratory in Freiberg, GDR .** Hebert, D.; Froelich, K.; Franke, Th.; Gellermann, R. (Bergakademie Freiberg, German Democratic Republic. Sektion Physik). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48563 (INIS-mf—10174, pp V/13) **New frontiers in low-radioactivity physics.** Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48564 (INIS-mf—10174, pp V/14) **New low-level laboratory of the "Bundesversuchs- und Forschungsanstalt Arsenal, Wien".** Aiginger, H.; Unfried, E.; Maringer, F.; Rank, D. (Atominstitut der Oesterreichischen Universitaeten, Vienna; Bundesversuchs- und Forschungsanstalt Arsenal, Vienna, Austria). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48565 (INIS-mf—10174, pp V/15) **Background components of germanium and NaI(Tl) low level spectrometers.** Heusser, G. (Max-Planck-Institut fuer Kernphysik, Heidelberg, Germany, F.R.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48566 (INIS-mf—10174, pp VI/18) **Some remarks on statistical measures of lower limit of detection.** Bucina, I.; Malatova, I. (Institut Hygieny a Epidemiologie, Prague, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48567 (INIS-mf—10174, pp VI/19) **Outliers rejection as a method of long-term stability of short-term instabilities inspection in low radioactivities measurements.** Walanus, A. (Politechnika Slaska, Gliwice, Poland. Inst. Fizyki). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48568 (INIS-mf—10174, pp VI/20) **Statistical estimations for predicting the detection limit of low activities.** Dimchev, T. (Vissh Minno-Geolozhki Inst., Sofia, Bulgaria). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48569 (INIS-mf—10174, pp VI/21) **Proportional needle counter.** Kowalski, T.Z.; Ostrovski, K.W.; Zajac, J. (Institute of Physics and Nuclear Techniques, Krakow, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48570 (INIS-mf—10174, pp VI/22) **Contribution to the multiwire corona counters theory.** Holy, K.; Geze, J.; Oravec, J. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48571 (INIS-mf—10174, pp VI/23) **Pulse shape analysis in multiwire proportional chamber.** Kvetan, K.; Oravec, J. (Faculty of Machine Engineering, Department of Physics, Trnava, Czechoslovakia; Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48572 (INIS-mf—10174, pp VI/24) **Parametrization of gas gain in proportional counter for low radioactivities measurements.** Kowalski, T.Z.; Ostrowski, K.W.; Zajac, J. (Uniwersytet Adama Mickiewicza, Poznan, Poland. Inst. Fizyki). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48573 (INIS-mf—10174, pp VI/25) **Low matter density cylindrical proportional chambers.** Filippov, A.I.; Fursov, A.P.; Korenchenko, A.S.; Korenchenko, S.M.; Kravchuk, N.P.; Nekrasov, K.G.; Vanko, J. (Joint Inst. for Nuclear Research, Dubna, USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48574 (INIS-mf—10174, pp VI/26) **Microcomputer based electronics for multielement proportional chambers.** Plesko, M. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48575 (INIS-mf—10174, pp VI/27) **Complex of scintillation equipments for high-precision measurements of radiocarbon abundance.** Metskhvarishvili, R.Ya.; Tsereteli, S.L.; Kocharov, G.E. (Tbilisskij Gosudarstvennyj Univ., USSR; AN SSSR, Leningrad. Fiziko-Tekhnicheskij Inst.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48576 (INIS-mf—10174, pp VI/28) **Accurate absorption technique for liquid scintillation measurement of carbon-14 in natural waters.** Yanev, Ya.L.; Kostadinov, K.N.; Chapkinova, G.T. (Sofia Univ., Bulgaria. Khimicheski Fakultet). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48577 (INIS-mf—10174, pp VI/29) **Influence of quenching effects to the scintillation efficiency of alpha- and beta-particles.** Schaefer, I. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden, German Democratic Republic). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48578 (INIS-mf—10174, pp VIII/33) **Design considerations of germanium detectors for very low level counting.** Helms, H.A. (PGT Princeton Gamma Tech Europa GmbH, Wiesbaden, Germany, F.R.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48579 (INIS-mf—10174, pp VIII/34) **Use of BGO in low level spectroscopy.** Nes, P. van. (Harshaw Chemie B.V., De Meern, Netherlands). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48580 (INIS-mf—10174, pp X/36) **Cosmogenic isotopes and cosmic ray intensity variations.** Kocharov, G.E. (AN SSSR, Leningrad. Inst. Vysokomolekulyarnykh Soedinenij). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48581 (INIS-mf—10174, pp X/42) **Effects of the Maunder and Spoerer minima in meteorite argon.** Lavrukhina, A.K.; Alexeev, V.A.; Ustinova, G.K. (AN SSSR, Moscow. Inst. Geokhimii i Analiticheskoj Khimii). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48582 (INIS-mf—10174, pp X/50) **On the registration of rare nuclear transformations by detecting multiple neutron emission events.** Flerov, G.N.; Ter-Akopian, G.M.; Sokol, E.A.; Saro, S.; Zeinalov, Sh.S.; Ivanov, M.P. (Joint Inst. for Nuclear Research, Dubna, USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48583 (INIS-mf—10174, pp XI/58) **Low-level counting facility for ^{14}C dating.** Csongor, E.; Hertelendi, E. (Magyar Tudomanyos Akademia, Debrecen. Atommag Kutato Intezete). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48584 (INIS-mf—10174, pp XII/61) **Low level tritium counting facilities: a survey.** Hut, G. (International Atomic Energy Agency, Vienna, Austria. Section of Isotope Hydrology). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48585 (INIS-mf—10174, pp XIII/69) **Position sensitive drift chamber.** Janik, R.; Opatrny, B.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48586 (INIS-mf—10174, pp XIII/70) **Radon measurements in air.** Planinic, J.; Orhanovic, Z. (Osijek Univ., Yugoslavia. Physics Div.; Zagreb Univ., Yugoslavia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48587 (INIS-mf—10174, pp XIII/71) **Method of absolute measurements of radon-daughters concentration in air.** Chalupnik, S.; Skubacz, K.; Lebecka, J. (Central Mining Institute, Katowice, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48588 (INIS-mf—10174, pp XIII/72) **Absolute method of radon activity determination.** Miliszkiewicz, A. (Wyzsza Szkola Pedagogiczna, Opole, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48589 (INIS-mf—10174, pp XIII/73) **Thermoluminescent monitor of low radon-daughters concentration in air.** Tomza, I.; Lebecka, J.; Skowronek, J. (Central Mining Institute, Katowice, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48590 (INIS-mf—10174, pp XIII/74) **Method of measurement of mixtures of radon and thoron decay products.** Oravec, J.; Dvorak, V. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta; Tesla, Premysleni, Czechoslovakia. Vyzkumny Ustav Pristroju Jaderne Techniky). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48591 (INIS-mf—10174, pp XIII/75) **Determination of the radon concentration in the atmosphere using NaI(Tl) spectrometer.** Holy, K.; Compel, J.; Oravec, J.; Florek, M.; Szarka, I. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48592 (INIS-mf—10174, pp XIII/83) **Measurements of gamma radiation in some Tatra caves with the portable scintillation counter for TL and ESR dating.** Hercman, H.; Walanus, A.; Bluszcz, A. (Politechnika Slaska, Gliwice, Poland. Inst. Fizyki). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48593 (INIS-mf—10174, pp XIV/86) **Double needle gas counter arrangement for measurements of low beta radioactivity solid emitters; first measurements.** Zastawny, A.; Rabsztyn, B. (Politechnika Slaska, Gliwice, Poland. Inst. Fizyki). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48594 (INIS-mf—10174, pp XIV/89) **Low-cost automated counter for laboratory beta-ray assay of rock and mineral samples.** Daroczy, S.; Papp, Z.; Demeny, A.; Vas, L.; Karacsonyi, Gy.; Berkes, I.; Halmi, A.; Varnagy, M. (Kossuth Lajos Tudomanyegyetem, Debrecen, Hungary. Alkalmazott Fizikai Intezet). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48595 (INIS-mf—10174, pp XVII/102) **Ge(Li)-detector measurements of γ-ray emitting environmental samples with non calibrated geometrically shape.** Knobus, B. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden, German Democratic Republic). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48596 (INIS-mf—10174, pp XVIII/113) **Radioactive gas monitor based on a plastic scintillation chamber.** Boehm, K.; Chudy, M.; Janik, R.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48597 (INIS-mf—10174, pp XVIII/114) **Multielement proportional counters.** Kubinec, P.; Franko, J.; Janik, R.; Plesko, M.; Povinec, P.; Szarka, J. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48598 (INIS-mf—10174, pp XVIII/115) **Large area corona counter for low-level alpha-activity measurements.** Holy, K.; Oravec, J.; Misianikova, E. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48599 (INIS-mf—10174, pp XVIII/116) **Monitor for continuous measurement of radionuclides in liquid wastes from nuclear power stations.** Garbinsky, L. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48600 (INIS-mf—10174, pp XVIII/117) **Monitor for continuous measurement of tritium and noble gases in nuclear power station.** Jina, J. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48601 (INIS-mf—10174, pp vp) **Contamination of methane prepared for radiocarbon dating by using commercial hydrogen containing tritium.** Obelic, B.; Srdoc, D.; Horvatincic, N. (Institut Rudjer Boskovic, Zagreb, Yugoslavia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48602 (INIS-mf—10174, pp III/5) **Spectrometer ARES.** Baranov, V.A.; Evtukhovich, P.G.; Filipov, A.I. (Joint Inst. for Nuclear Research, Dubna, USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48603 (INIS-mf—10191) **Construction of a time-of-flight neutron spectrometer for reaction angles 0° *U*htheta < = 180° and study of the reaction ^{65}Cu(p,xn) ^{65}Zn for Esub(p) = 26.7 MeV.** Holler, Y. (Hamburg Univ. (Germany, F.R.). Fachbereich Physik). 19 Nov 1984. 95p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752588.

At the Hamburg Isochronous Cyclotron a novel time-of-flight neutron spectrometer was designed, constructed, and tested by means of a for the planned application typical nuclear reaction. The apparature was optimized for the measurement of continuous, structure-deficient neutron spectra in a wide angular range at a reproducible, as low as possible scattering neutron background. Such a facility is fitted to the strengths of the Hamburg cyclotron and allows to study questions on the precompound emission and on the inelastic projectile (^{3}He) breakup. The final test was performed with the reaction ^{65}Cu(p,xn)^{65}Zn at Esub(p) = 26.7 MeV for which already comparable data over a smaller angular range were present. In the analysis of the measurement results performed regarding the precompound effects the hybrid-exciton model calculations let recognize essential deviations at high neutron energies in the range of the extreme reaction angles.

48604 (IPNO-DRE—85-05) **Basic principles of CAMAC.** Monnet, F. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire). 1985. 27p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750872.

After a schematic presentation of an acquisition system, CAMAC standard is detailed. Parallel branch mode, the most important CAMAC functions, and timing of an operation in a rack are shown. Branch protocol and fundamental rules for multisource operations are also described.

48605 (JAERI-M—85-042) **Radioactivity measurement of barium carbonate [^{14}C] by liquid scintillation counting.** Kobayashi, Katsutoshi; Hoizumi, Kiyoshi. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Mar 1985. 25p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. File Number DE86703199.

Two methods of sample preparation for the measurement of specific activity of $BaCO_3[^{14}C]$ by external standard method in liquid scintillation counting were studied. $BaCO_3[^{14}C]$ was decomposed by perchloric acid solution and generated $CO_2[^{14}C]$ was absorbed by ethylene glycol monomethyl ether solution of monoethanolamine as the method 1 or aqueous sodium hydroxide as the method 2. In order to prepare the sample solution of adequate radioactivity concentration, these carbonate solutions by the methods 1 and 2 were diluted with the suitable organic solvent and distilled water respectively. One tenth millilitre of these sample solutions was added into 10 ml of PPO-toluene scintillator containing 0.1 ml of monoethanolamine in a counting vial and homogeneously dissolved with ethyl alcohol. The results of the radioactivity measurement of $BaCO_3[^{14}C]$ based on the different method agreed within 5% and the counting rate was found to be stable for as long as 7 days or more. Both methods of preparation are suitable for the routine measurement because of their simplicity and feasibility. In the case of method 2, the liquid radioactive waste is almost inorganic solution and recovery in the form of $BaCO_3[^{14}C]$ is easily performed, so that this method is very advantageous from the view point of the radioactive waste treatement.

48606 (KAPL—4193) **Improved set of Auger data analysis programs for physical electronics Auger spectrometer systems.** Mulford, R.A.; Austin, F.S.; Merchant, R.W. (Knolls Atomic Power Lab., Schenectady, NY (USA)). Mar 1986. Contract AC12-76SN00052. 46p. (CONF-860829—33). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86009673.

From Annual joint meeting of the Electron Microscopy of America and the Microbeam Analysis Society; Albuquerque, NM, USA (10 Aug 1986).

This report describes a set of utility programs for the display and analysis of Auger spectral data collected with Physical Electronics (PHI) Auger Spectrometers using the embedded computer data acquisition system that is standard on PHI spectrometers. These programs are designed to replace the routines supplied by the manufacturer and offer the user greater flexibility. All routines will run on standard PHI systems equipped with HP2648 or HP2623 computer terminals. The major feature of these programs is the "windowing" capability for quantitative analysis of a list of elements. Spectra are collected and saved to disk using the PHI acquisition system in the usual fashion, except that it is not necessary to specify the elements that are present before the analysis is performed. The spectrum can be divided into any convenient arrangement of energy regions. This procedure permits the energy regions for data acquisition to be larger than the element windows to minimize the effect of the end points on the numerical differentiation. It is also easier to analyze closely spaced peaks, such as oxygen and chromium. When the spectra are processed, each region is automatically differentiated and displayed in sequence, with the energy windows for the Auger peaks marked in reverse video. Window limits can be moved easily, and multiple files can be analyzed using one setup. Results are stored on disk, together with the raw peak-to-peak heights and the sensitivity factors used. These disk files can then be read by simple auxiliary programs to average or tabulate results. 3 refs., 1 fig.

48607 (LA-UR—86-2413) Fast, simple dB/dt probe. Toevs, J.W.; Kruse, P.J.; Freeman, B.L. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 6p. (CONF-860703—22). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013838.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

A simple dB/dt detector has been developed for monitoring fast current pulses in hostile environments. The detector consists of semirigid coaxial cable, which has been terminated by bending the center conductor back onto the shield and soldering it to the shield. Calibration with the beam from an electron linac has shown the integrated FWHM response to the electron-beam pulse to be less than 50 picoseconds. Measurements in a differential mode in a high radiation field have indicated that the sensitivity to gamma radiation is about 10^{-15} A/rad/s. An application of the probe is to determine gamma-ray fluxes from underground nuclear tests by measurement of Compton currents generated in a thin plate by the gamma rays.

48608 (LA-UR—86-2590) Cygnus experiment at Los Alamos. Dingus, B.L.; Goodman, J.A.; Gupta, S.K.; Talaga, R.L.; Chang, C.Y.; Yodh, G.B.; Bolton, R.D.; Burman, R.L.; Butterfield, K.B.; Cady, R. (Maryland Univ., College Park (USA); Los Alamos National Lab., NM (USA); George Mason Univ., Fairfax, VA (USA); New Mexico Univ., Albuquerque (USA); California Univ., Irvine (USA)). 1986. Contract W-7405-ENG-36. 6p. (CONF-8606182—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013825.

From 5. international school of cosmic ray astrophysics; Erice, Italy (1 Jun 1986).

The Cygnus experiment at Los Alamos National Laboratory has been designed to study, with high angular accuracy, point sources of gamma rays of energy above 10^{14} eV. The experimental detector consists of an air shower array to observe gamma-ray showers and a shielded, large-area track detector to study the muon content of the showers. In this paper we present preliminary data from the array and describe its performance. 9 refs., 3 figs.

48609 (LPC—85-01) Fast and flexible vertex fit. Billoir, P. (College de France, 75 - Paris. Lab. de Physique Corpusculaire). 1985. 17p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86750864.

A least squares method is proposed to fit the geometrical parameters of a set of curved tracks assumed to originate in a common vertex: the parameters measured independently for each track are first extrapolated with their weight matrix to a point close to the expected vertex position; then a local parabolic parametrization of the trajectories is used in a fast fitting procedure, where all parameters (vertex coordinates and track parameters) are modified at each iteration: the global amount of computation is roughly proportional to the number of tracks. Moreover this formalism is well suited to add a track to an existing vertex, or to remove a track from it.

48610 (MPI-PAE/Exp.El.—163) Results from a test of a Cu-scintillator calorimeter module with photodiode readout. Fischer, F.; Kiesling, C.; Lorenz, E.; Mageras, G.; Scholz, S. (Max-Planck-Institut fuer Physik und Astrophysik, Muenchen (Germany, F.R.). Werner-Heisenberg-Inst. fuer Physik). May 1986. 28p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86752606.

A calorimeter module of 17 radiation lengths depth has been built. Wavelength shifter (WLS) bars coupled to rectangular silicon photodiodes (PD's) are use as readout. Considerations in the design of the WLS bars, with particular emphasis on optimising the efficiency for PD readout, are discussed. The energy resolution for electrons has been determined to be about $9\%/\sqrt{E}$ between 2 and 50 GeV. The response to hadrons is presented and the prospects for the construction of a full-sized hadron calorimeter are discussed.

48611 (PNL-SA—13220) Semi-empirical model of neutron and charged particle interactions with CR-39. Parkhurst, M.A.; Hadlock, D.E.; Faust, L.G. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1985. Contract AC06-76RL01830. 7p. (CONF-8609110—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011121.

From International conference on solid state nuclear track detectors; Rome, Italy (23 Sep 1986).

The theory behind track detector response to neutrons is important to the calculation of dose equivalent, and the factors involved in track formation are diverse. We have envisioned a process by which individual parameters important to track interpretation would be identified, quantified, and categorized for use in model development and Monte Carlo calculations to establish dose equivalent algorithms. This paper focuses on just a few of the interactions under investigation in pursuit of empirical model development.

48612 (PPA-T—11) Simple and reliable method of calibrating Ge(Li) or GEM high resolution gamma spectrometer. Lau How Mooi. (Unit Tenaga Nuklear, Bangi, Selangor (Malaysia)). 1981. 12p. Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia.

A simple and reliable method of calibrating high resolution gamma-ray spectrometer is presented. Comparisons are made between this method and that calibrated by using standard sources (mixed radionuclides gamma-ray reference standards, QCY 44 from Amersham Ltd.). Both sets of results agree very well with each other. This study shows that it is not necessary to obtain standard reference sources, which normally take a long time to obtain and in addition involve high costs for calibrating the spectrometer.

48613 (SAND—86-1473) Sodium Iodide Detector Analysis Software (SIDAS). Mitchell, D.J. (Sandia National Labs., Albuquerque, NM (USA). Monitoring Systems Div.). Jun 1986. Contract AC04-76DP00789. 78p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014943.

The Sodium Iodide Detector Analysis Software (SIDAS) comprises a set of Fortran programs used to calibrate scintillation detector response functions, synthesize spectra for gamma ray sources, and analyze gamma spectra of unknown isotopic compositions. The SIDAS software was originally written to analyze spectra recorded with sodium iodide (NAI) detectors, but it has also been applied successfully to bismuth germanate (BGO) detectors. Spectra calculated by SIDAS are based on analytical functions employing a set of parameters that are determined during calibration to give the best match between calculated and measured spectra. The spectra include the contributions from: the photopeaks, single and double escape peaks, iodine x-ray escape peaks, annihilation photons created outside the detector, Compton and backscatter continuua, bremsstrahlung radiation, and lead x-rays created near the detector. The effects of coincident and random pile-up events are also computed. This document describes how the software is used and discusses some of the computational methodology. 17 figs., 6 tabs.

48614 (SLAC-PUB—3968) SLAC pulsed x-ray facility. Ipe, N.E.; McCall, R.C.; Baker, E.D. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 8p. (CONF-8606139—4). NTIS, PC A02/MF A01; GPO Dep. File Number DE86012045.

From Health Physics Society meeting; Pittsburgh, PA, USA (30 Jun 1986).

The Stanford Linear Accelerator Center (SLAC) operates a high energy (up to 33 GeV) linear accelerator delivering pulses up to a few microseconds wide. The pulsed nature of the electron beam creates problems in the detection and measurement of radiation both from the accelerator beam and the klystrons that provide the rf power for the accelerator. Hence, a pulsed x-ray facility has been built at SLAC mainly for the purpose of testing the response of different radiation detection instruments to pulsed radiation fields. The x-ray tube consists of an electron gun with a control grid. This provides a stream of pulsed electrons that can be accelerated towards a confined target-window. The window is made up of aluminium 0.051 cm (20 mils) thick, plated on the vacuum side with

a layer of gold 0.0006 cm (1/4 mil) thick. The frequency of electron pulses can be varied by an internal pulser from 60 to 360 pulses per second with pulse widths of 360 ns to 5 μs. The pulse amplitude can be varied over a wide range of currents. An external pulser can be used to obtain other frequencies or special pulse shapes. The voltage across the gun can be varied from 0 to 100 kV. The major part of the x-ray tube is enclosed in a large walk-in-cabinet made of 1.9 cm (3/4 in) plywood and lined with 0.32 cm (1/8 in) lead to make a very versatile facility. 3 refs., 5 figs.

48615 (SLAC-PUB—3980) Beamstrahlung monitor for SLC final focus using gamma ray energies. Bonvicini, G.; Field, C.; Minten, A. (Michigan Univ., Ann Arbor (USA); Stanford Linear Accelerator Center, Menlo Park, CA (USA); European Organization for Nuclear Research, Geneva (Switzerland)). May 1986. Contract AC03-76SF00515. 2p. (CONF-860629—21). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012876.

From Linear accelerator conference; Stanford, CA, USA (2 Jun 1986).

Features of the beamstrahlung flux from the SLC interaction point are discussed, and intensity estimates given. A Cherenkov detector intended to monitor the flux is described.

48616 (SLAC-PUB—4017) Lifetime tests for MAC vertex chamber. Nelson, H.N. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jul 1986. Contract AC03-76SF00515. 7p. (CONF-860162—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014473.

From Workshop on radiation damage to wire chambers; Berkeley, CA, USA (16 Jan 1986).

A vertex chamber for MAC was proposed to increase precision in the measurement of the B hadron and tau lepton lifetimes. Thin-walled aluminized mylar drift tubes were used for detector elements. A study of radiation hardness was conducted under the conditions of the proposed design using different gases and different operating conditions. (LEW)

48617 (SLAC-PUB—4020) Front-end data processing the SLD data acquisition system. Nielsen, B.S. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jul 1986. Contract AC03-76SF00515. 10p. (CONF-8605164—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013434.

From 2. topical seminar on perspectives for experimental apparatus at future high energy machines; San Miniato, Italy (5 May 1986).

The data acquisition system for the SLD detector will make extensive use of parallel at the front-end level. Fastbus acquisition modules are being built with powerful processing capabilities for calibration, data reduction and further pre-processing of the large amount of analog data handled by each module. This paper describes the read-out electronics chain and data pre-processing system adapted for most of the detector channels, exemplified by the central drift chamber waveform digitization and processing system.

48618 Parallel-plate time projection chamber operation in a magnetic field. Gruhn, C.; Natkaniec, Z.; Peisert, A.; Sauli, F. (Lawrence Berkeley Lab., CA, USA; European Organization for Nuclear Research, Geneva, Switzerland). 247: No. 3, 460-466(1 Jul 1986).

A small time projection chamber with a parallel-plate avalanche chamber as an end-cap detector was tested in a magnetic field of up to 10 kG. An increase of sparking rate at a given gain with increasing magnetic field was observed.

48619 State-of-the-art digital radiation survey meter. Mahathy, J.M.; DeArmond, J.G. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN). pp 41-46 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

The prototype design for a new radiation survey meter includes a microprocessor, battery-backed data RAM, and the necessary hardware and software for data transfer. The human interface and other design features are discussed in the text. The unit should provide improved efficiency and data integrity. The data will be transferred to a personal computer which will do the necessary analysis. Some of the data will subsequently be transferred from the personal computer to a larger minicomputer where additional analyses and reports will be performed. One of these will be automated scheduling of area surveys.

48620 Improved readout system for multi-crystal gamma cameras. Derenzo, S.E. (to Dept. of Energy). US Patent Application 6-768,080. 21 Aug 1985. 16p. Contract AC03-76SF00098. DE86013746 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013746.

A radioisotope camera having an array of scintillation crystals arranged in N rows and M columns and adapted to be struck by gamma-rays from a subject, a separate solid state photodetector optically coupled to each crystal, and N + M amplifiers connected to the photodetectors to distinguish the particular row and column of an activated photodetector. One of the anode or cathode leads of each photodetector is coupled to the row amplifier associated with the row containing that photodetector while the other of the two leads is coupled to the column amplifier associated with the column containing that photodetector.

48621 Apparatus for reading two-dimensional electrophoretograms containing β-ray-emitting labeled compounds. Anderson, H.L.; Kinnison, W.W.; Lillberg, J.W. (to Dept. of Energy). US Patent Application 6-728,965. 30 Apr 1985. 21p. Contract W-7405-ENG-36. DE86013865 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013865.

An apparatus and method for electronically reading planar two-dimensional β-ray emitter-labeled gel electrophoretograms. A single, flat rectangular multiwire proportional chamber is placed in close proximity to the gel and the assembly placed in an intense uniform magnetic field disposed in a perpendicular manner to the rectangular face of the proportional chamber. Beta rays emitted in the direction of the proportional chamber are caused to execute helical motions which substantially preserve knowledge the coordinates of their origin in the gel. Perpendicularly oriented, parallel wire, parallel plane cathodes electronically sense the location of the β-rays from ionization generated thereby in a detection gas coupled with an electron avalanche effect resulting from the action of a parallel wire anode located therebetween. A scintillator permits the present apparatus to be rendered insensitive when signals are generated from cosmic rays incident on the proportional chamber. Resolution for concentrations of radioactive compounds in the gel exceeds 700-μm. The apparatus and method of the present invention represent a significant improvement over conventional autoradiographic techniques in dynamic range, linearity and sensitivity of data collection. A concentration and position map for gel electrophoretograms having significant concentrations of labeled compounds and/or highly radioactive labeling nuclides can generally be obtained in less than one hour.

48622 Radiation detector spectrum simulator. Wolf, M.A.; Crowell, J.M. (to Dept. of Energy). US Patent Application 6-721,352. 9 Apr 1985. 9p. Contract W-7405-ENG-36. DE86013802 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013802.

A small battery operated nuclear spectrum simulator having a noise source generates pulses with a Gaussian distribution of amplitudes. A switched dc bias circuit cooperating therewith to generate several nominal amplitudes of such pulses and a spectral distribution of pulses that closely simulates the spectrum produced by a radiation source such as Americium 241.

48623 Fast counting electronics for neutron coincidence counting. Swansen, J.E. (to Dept of Energy). US Patent Application 6-708,477. 5 Mar 1985. 15p. Contract W-7405-ENG-36. DE86013782 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013782.

An amplifier-discriminator is tailored to output a very short pulse upon an above-threshold input from a detector which may be a ^{3}He detector. The short pulse output is stretched and energizes a

light emitting diode (LED) to provide a visual output of operation and pulse detection. The short pulse is further fed to a digital section for processing and possible ORing with other like generated pulses. Finally, the output (or ORed output) is fed to a derandomizing buffer which converts the rapidly and randomly occurring pulses into synchronized and periodically spaced-apart pulses for the accurate counting thereof. Provision is also made for the internal and external disabling of each individual channel of amplifier-discriminators in an ORed plurality of same.

48624 **New neutron small-angle diffraction instrument at the Brookhaven High Flux Beam Reactor.** Schneider, D.K.; Schoenborn, B.P. (Brookhaven National Lab., Upton, NY). pp 119-141 of Neutrons in biology. Schoenborn, B.P. (ed.). New York, NY; Plenum Publishing Corporation (1984).

This instrument utilizes cold neutrons emerging from a series of straight neutron guides. A multilayered monochromator is used in combination with a short collimator to obtain a monochromatized beam with a wavelength between 4 and 10 A and a wavelength spread of about 10%. The flux at 5 A exceeds 10^6 ns^{-1} cm^{-2} in a typical beam of 6-mm diameter at the sample. The spectrometer itself incorporates provisions for computer-controlled positioning of samples and a two-dimensional detector. At a sample-detector distance between 50 and 200 cm the detector can be centered at scattering angles of up to 45°. The beam-defining components, the monochromator, the collimator, and various slits, are easily accessible and exchangeable for alternative devices. These features make the instrument modular and give it flexibility approaching that of standard x-ray equipment. The facility in its first year on line was used most of the time for solution-scattering experiments. These included experiments to investigate the structure of plasma lipoproteins, to further the triangulation of the small ribosomal subunit, and to characterize micellar microemulsions. The spectrometer is equally suited to measuring diffraction at higher angles on oriented specimens. In this paper, the components of the instrument are described, its performance is discussed, and characteristic parameters are compiled. 25 references, 14 figures, 3 tables.

48625 **Superheated drop nucleation for neutron detection.** Apfel, R.E.; Chu, B.T.; Mengel, J. (Yale Univ., New Haven, CT). *Applied Scientific Research (The Hague);* **38**: 117-122(1982).

Moderately superheated drops of liquid in a gel will vaporize when exposed to neutrons. The basic characteristics of such detectors are described, with emphasis on a model for the dynamics of the process of vapor bubble nucleation. 5 references, 1 figure.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

REFER ALSO TO CITATION(S) 47974, 48309

48626 (INIS-mf—10173, pp 53) **Laboratory study of radiation damage to drift chambers.** Kotthaus, R.; Ishihara, N.; Kohriki, T.; Kubo, K.; Nakamura, S.; Odaka, S.; Suekane, F.; Watase, Y. (National Lab. for High Energy Physics, Oho, Ibaraki, Japan; Max-Planck-Institut fuer Physik und Astrophysik, Muenchen, Germany, F.R.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48627 (N—86-23551) **Cosmic ray simulation and testing program. Final Report, January-November 1984.** Kolasinski, W.A.; Koga, R.; King, C.G.; Imamoto, S.I. (Aerospace Corp., Los Angeles, CA (USA)). Apr 1985. 54p. (NASA-CR—177860). NTIS, PC A04/MF A01.

Single event upset (SEU) and latchup vulnerabilities were determined for a number of parts of interest to NASA space programs. In cases where a threshold linear energy transfer (LET) for SEU could be measured, an upset rate in a low inclination Space Shuttle orbit was computed. The predicted upset rates are extremely low, except for the devices with LET thresholds below the geomagnetic cutoff for altitude and inclination of the Space Shuttle orbit. While some of the devices do exhibit latchup, the cross sections and threshold LETs are such that the risk associated with flying these devices in low, near equatorial orbits is small if not negligible.

4403 Miscellaneous Instruments

REFER ALSO TO CITATION(S) 47167, 47187, 47237, 47287, 47382, 47874, 47875, 47876, 47877, 47878, 47879, 47880, 47881, 47882, 47883, 47885, 48029, 48075, 48214, 48234, 48268, 48287, 48288, 48383, 48407, 48515, 48961, 49505

48628 (ANL—85-22, pp 100-101) **Laser spectroscopy of radioactive atoms.** Davids, C.N.; Lewis, D.A.; Kumar, J.; Finn, M.A.; Greenlees, G. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A new helium jet target cell was installed having a smaller capillary. This reduced considerably the helium flow rate, but the transported radioactivity remained at about the same level. However, large fluctuations in the yields were still present. Extensive checks using electric fields of both polarities showed that the transported radioactivities were not associated with charged species, since no change in yields was observed with the electric fields. In order to check that the optics in the helium jet chamber were performing properly, an oven was constructed and installed under the elliptical cylinder light collector. With natural Ba loaded into the oven, strong resonance fluorescence was observed with the laser. Finally the laser system was employed to search for resonance fluorescence with radioactive ^{126}Ba made by a beam from the tandem linac system. No signals were seen above background. Activity measurements showed several hundred ^{126}Ba nuclei/s were passing through the laser beam, and the optical sensitivity was such that a factor of at least a hundred fewer atoms would have been easily observed. A test using a beam of Na ions from the tandem accelerator stopping in the target cell was tried. With the laser tuned to one of the Na D1 components, no resonance fluorescence was observed.

48629 (BNL—38364) **EXAFS and reflectivity studies of surfaces and interfaces using glancing angle x-rays.** Heald, S.M.; Chen, H.; Tranquada, J.M. (Brookhaven National Lab., Upton, NY (USA). Applied Science Dept.). 1986. Contract AS05-80ER10742;AC02-76CH00016. 7p. (CONF-860880—18). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014171.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

X-rays at glancing angles have a short controllable penetration depth which can be used to advantage in studying surfaces and interfaces. Data are presented for Cu-Al and Ag-Au bilayers which demonstrate the utility of x-ray reflectivity and extended x-ray absorption fine structure (EXAFS) measurements. X-ray reflectivity measurements are sensitive to layer thickness and interface roughness, while the EXAFS probes the atomic scale environment of the interface atoms. As the samples are annealed clear changes are observed in both techniques indicative of the growth of interfacial $CuAl_2$ for the Cu-Al samples and interdiffusion for Ag-Au. Interface sensitivity is verified for the Cu-Al samples by the observations that the EXAFS signal changes from Cu-like to $CuAl_2$-like with the growth of ~100 A of $CuAl_2$. Quantitative fits to the x-ray reflectivity data are used to obtain interface roughness, and indicate that the growing $CuAl_2$ layer has a roughness comparable to its thickness. This is consistent with compound growth proceeding predominantly along grain boundaries.

48630 (K/TS—11-771) **Thermal phosphor research survey.** Dowell, L.J.; Gillies, G.T.; Allison, S.W.; Cates, M.R. (Virginia Univ., Charlottesville (USA). Dept. of Nuclear Engineering and Engineering Physics; Oak Ridge Gaseous Diffusion Plant, TN (USA)). Jul 1986. Contract AC05-84OT21400. 72p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014373.

This document is a survey of the technical literature concerning aspects of phosphor materials science and spectroscopy

which are of interest. These materials are the basis of temperature measurement methods currently under development. The numerical identification to the left of each citation is that given in the Physics Abstracts. 750 refs.

40631 (LA-UR—86-2637) High spatial resolution in x-ray fluorescence. Zahrt, J.D. (Los Alamos National Lab., NM (USA). Applied Theoretical Physics Div.). 1986. Contract W-7405-ENG-36. 14p. (CONF-860891—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013820.

From Denver X-ray conference; Denver, CO, USA (4 Aug 1986).

The design of diffracting crystals for use in x-ray fluorescence spectrometers is discussed. Characteristics of the Johan and Johansson geometries are discussed and intensity profiles are developed. If the diffraction line has a finite width, concentration gradients will not be faithfully reproduced by gradients in the signal as the sample is scanned. Boundary effects for four types of concentration gradient are presented; as step function, linear gradients, exponential gradient, and Gaussian gradient. (DWL) 13 refs., 8 figs.

40632 (LBL—20466) Reflection grating spectrometer for the x-ray multi-mirror (XMM) space observatory: design and calculated performance. Hettrick, M.C.; Kahn, S.M. (Lawrence Berkeley Lab., CA (USA)). Oct 1985. Contract AC03-76SF00098. 14p. (CONF-8511123—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013485.

From 2. international technical symposium on optical and electro-optical applied science and engineering; Cannes, France (25 Nov 1985).

A spectrometer design candidate is presented for the X-ray Multi-Mirror (XMM) observatory, being planned by the European Space Agency (ESA) as a long-lived large-area of telescopes. The science requirement of moderate resolution ($E/\Delta E \sim 100$) spectroscopy in a two octave region (0.5 to 2 keV) with extremely high throughput (effective area > 500 cm^2) results in the use of grazing incidence reflection gratings. Due to the low image quality of the telescopes ($\sim$ 1 minute of arc), the grating dispersion must be maximized by use of the classical grating mount in which the spectrum is dispersed within the plane of incident radiation. Due to the small field of view by the x-ray telescopes, the gratings must be situated in the converging beam at the exit of the telescope. A spectrometer module consists of a thin-foil conical mirror telescope, a stack of plane varied-space reflection gratings and an imaging proportional counter. This system is analyzed on the basis of dispersion, geometric aberrations and efficiency. At a spectral resolution of 0.15 A, a twenty module XMM would attain an average effective area of $\sim$900 cm^2, reaching twice this value at the peak wavelength (15 A). Similar throughput is obtained in second order centered at 7.5 A, the two spectral orders separated by the non-dispersive energy resolution of the proportional counter. Continuous spectra are obtained in the 6-25 A band (0.5 to 2 keV), and can be extended to 45 A if desired by tuning of the grating. The instrument sensitivity is sufficient to allow the first spectral detection of soft x-ray features in external galaxies, with access to an estimated population of several hundred active galactic nuclei. Such observations will expand vastly the roles feasible for spectroscopy in x-ray astrophysics, marking the beginning of a new era in space astronomy.

40633 (LINO—24) Timing apparatus. Timmer, P. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands)). Nov 1985. 17p. (In Dutch). NTIS, PC A02/MF A01.

The apparatus required for bundle-synchronous timing is described. Bundle-synchronous timing signals are used along accelerators and in experimental stations. The apparatus consists of a trigger modulator, a trigger detector, a delayed pulse generator, and a pulse output module. The excitation and detection of bundle-synchronous triggers, and the pulse output module are described. The trigger network, including modulator and detector, is explained.

40634 (SAND—86-1544C) Streak measurements of the RADLAC-11 relativistic electron beam. Crist, C.E.; Leifeste, G.T.; Ekdahl, C.A. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 5p. (CONF-8606153—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012945.

From DARPA conference; Albuquerque, NM, USA (23 Jun 1986).

A computer-controlled streak camera system has been configured for use in the lead pulse stability experiments on the RADLAC-II accelerator. The system consists of a Digital Equipment Corporation (DEC) LS-11/73 computer, a Hamamatsu C1000 SIT camera, a Hamamatsu C1440-04 temporal analyzer, and a Hamamatsu C1370 streak camera. The instrument provides 100 nsec streak records with a spacial resolution of better than 0.5 cm. A description of the system will be given along with typical output using data from the 1985 summer propagation experiment. 3 figs.

40635 (SAND—86-1606) Characterization of accelerometer mountings in shock environments. Boatman, V.I.; Solomon, O.M. Jr. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1986. Contract AC04-76DP00789. 42p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014941.

This report describes the shock test characterization of four accelerometer mounting techniques which are: adiprene and wax, polysulfide rubber and wax, restrained adiprene, and hard mount. The mountings have all been used in field tests, and the shock testing provides some simulation of the field test environments. The characteristics of these mountings are analyzed in the time-domain and in the frequency-domain and are compared to the response of a reference accelerometer at two different shock levels, approximately 2 kg and 7 kg. While soft mounting techniques can be used to guarantee acceleratometers survival in severe mechanical environments, this report documents the tested mounting materials to be highly nonlinear. These nonlinearities result in significant data distortion at frequencies above a few hundred hertz.

40636 (UCRL—15830) Development of a Fiber Fluorescence Immunoassay device. Final report, October 1, 1984-December 31, 1985. Block, M. (ORD, Inc., Everett, MA (USA)). 1986. Contract W-7405-ENG-48. 43p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014453.

This subcontract required the development, construction and delivery of the first of two prototype portable Fiber Fluorescence Immunoassay (FFIA) instruments within 6 months. This report describes the development and construction of the two prototype portable field instruments. Results are reported of additional development performed for the purpose of evaluating components and subsystems for the prototype instruments.

40637 Rectangular waveguide calorimeter for single intense microwave pulses. Earley, L.M.; Ballard, W.P.; Roose, L.D. (Microwave Physics Division, Sandia National Laboratories, Albuquerque, New Mexico 87185). **57**: No. 9, 2359-2361(Sep 1986).

A new calorimeter for single intense microwave pulses has been designed and tested. The device was constructed in WR284 rectangular waveguide and was operated at frequencies from 2.5 to 4.3 GHz with a tunable instantaneous bandwidth of approximately 500 MHz. The calorimeter used a single thermistor to measure the energy deposited on a carbon absorber having a microwave power absorbance of 90%. The calorimeter was tested at power levels from 100 to 1000 MW for pulse lengths of 12—6 ns, respectively. The sensitivity of the device was 200—300 mV/J.

40638 Inexpensive and high-precision digital power supply and counting interface for UPS, XPS, and Auger spectrometers. Lichtenberger, D.L.; Kellogg, G.E.; Kristofzski, J.G.; Page, D.; Turner, S.; Klinger, G.; Lorenzen, J. (Laboratory for Electron Spectroscopy and Surface Analysis, Department of Chemistry, University of Arizona, Tucson, Arizona 85721). **57**: No. 9, 2366-2366(Sep 1986).

A digital data-acquisition system has been built to interface two photoelectron spectrometers to a DEC LSI-11/23 processor.

40639 Energy dissipation processes in scanning tunneling microscopy. Flores, F.; Echenique, P.M.; Ritchie, R.H. (Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37831). **34**: No. 4, 2899-2902(15 Aug 1986).

Energy dissipation associated with assisted tunneling processes in scanning tunneling microscopy is analyzed and compared

with the normal tunnel current. We find that, for high voltages, greater than one volt, the tunneling processes associated with electron-hole pair excitation control the increase in temperature at the microscope's interface.

48640 **Spectral line-diode registry effects with photodiode array detectors.** Winge, R.K.; Fassel, V.A.; Eckels, D.E. (Ames Laboratory and Department of Chemistry, Iowa State University, Ames, Iowa 50011). *Applied Spectroscopy;* 40: No. 4, 461-463(May 1986). Contract W-7405-ENG-82.

A limitation of photodiode array detectors for spectroscopic intensity measurements relates to the spacing of the diodes and the errors generated when a spectral line is not in exact registry with the diode or diodes from which its intensity is being measured. These misregistry intensity errors, which may be as high as 25 to 30%, are documented for a range of spectral bandwidths and for single diode (pixel) intensities and multiple diode summations of intensities.

48641 **Pattern recognition in piezoelectric sensor research at the Center for Process Analytical Chemistry.** Beebe, K.R.; Illman, D.L.; Carey, W.P.; Kowalski, B.R.; Hirschfeld, T. (Univ. of Washington, Seattle). pp 309-314 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

An introduction to Process Analytical Chemistry is given, and an application of chemometrics to a specific problem is discussed. Principle component analysis is used to select an array of seven piezoelectric crystal sensors from an original set of 27 possibilities. The goal of the procedure is to devise a rational selection technique that can be employed to select the most information-rich array of sensors.

48642 **Chemoresistive gas sensor.** Hirschfeld, T.B. (to Dept. of Energy). US Patent Application 6-781,543. 30 Sep 1985. 14p. Contract W-7405-ENG-48. DE86013766 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013766.

A chemoresistive gas sensor is provided which has improved sensitivity. A layer of organic semiconductor is disposed between two electrodes which, in turn, are connected to a voltage source. High conductivity material is dispersed within the layer of organic semiconductor in the form of very small particles, or islands. The average interisland spacing is selected so that the predominant mode of current flow is by way of electron tunneling. Adsorption of gaseous contaminant onto the layer of organic semiconductor modulates the tunneling current in a quantitative manner.

48643 **Multichannel optical sensing device.** Selkowitz, S.E. (to Dept. of Energy). US Patent Application 6-766,168. 16 Aug 1985. 26p. Contract AC03-76SF00098. DE86013675 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013675.

A multichannel optical sensing device is disclosed, for measuring the outdoor sky luminance or illuminance or the luminance or illuminance distribution in a room, comprising a plurality of light receptors, an optical shutter matrix including a plurality of liquid crystal optical shutter elements operable by electrical control signals between light transmitting and light stopping conditions, fiber optical elements connected between the receptors and the shutter elements, a microprocessor based programmable control unit for selectively supplying control signals to the optical shutter elements in a programmable sequence, a photodetector including an optical integrating spherical chamber having an input port for receiving the light from the shutter matrix and at least one detector element in the spherical chamber for producing output signals corresponding to the light, and output units for utilizing the output signals including a storage unit having a control connection to the microprocessor based programmable control unit for storing the output signals under the sequence control of the programmable control unit.

48644 **Gage for measuring displacements in rock samples.** Holcomb, D.J.; McNamee, M.J. (to Dept. of Energy). US Patent Application 6-756,127. 18 Jul 1985. 26p. Contract AC04-76DP00789. DE86013694 NTIS, PC A03/MF A01; GPO Dep. File Number DE86013694.

A gage for measuring diametral displacement within a rock sample for use in a rock mechanics laboratory and in the field, comprises a support ring housing a linear variable differential transformer (LVDT), a mounting screw, and a leaf spring. The mounting screw is adjustable and defines a first point of contact with the rock sample. The leaf spring has opposite ends fixed to the inner periphery of the mounting ring. An intermediate portion of the leaf spring projecting radially inward from the ring is formed with a dimple defining a second point of contact with the sample. The first and second points of contact are diametrically opposed to each other. The LVDT is mounted in the ring with its axis parallel to the line of measurement and its core rod received in the dimple of the leaf spring. Any change in the length of the line between the first and second support points is directly communicated to the LVDT. The leaf spring is rigid to completely support lateral forces so that the LVDT is free of all load for improved precision.

48645 **Tube wall thickness measurement apparatus.** Lagasse, P.R. (to Dept. of Energy). US Patent Application 6-747,204. 21 Jun 1985. 14p. Contract W-7405-ENG-36. DE86013742 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013742.

An apparatus for measuring the thickness of a tube's wall for the tube's entire length and radius by determining the deviation of the tube wall thickness from the known thickness of a selected standard item. The apparatus comprises a base and a first support member having first and second ends. The first end is connected to the base and the second end is connected to a spherical element. A second support member is connected to the base and spaced apart from the first support member. A positioning element is connected to and movable relative to the second support member. An indicator is connected to the positioning element and is movable to a location proximate the spherical element. The indicator includes a contact ball for first contacting the selected standard item and holding it against the spherical element. The contact ball then contacts the tube when the tube is disposed about the spherical element. The indicator includes a dial having a rotatable needle for indicating the deviation of the tube wall thickness from the thickness of the selected standard item.

48646 **Remotely readable fiber optic compass.** Migliori, A.; Swift, G.W.; Garrett, S.L. (to Dept. of Energy). US Patent Application 6-728,976. 30 Apr 1985. 21p. Contract W-7405-ENG-36. DE86013708 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013708.

A remotely readable fiber optic compass. A sheet polarizer is affixed to a magnet rotatably mounted in a compass body, such that the polarizer rotates with the magnet. The optical axis of the sheet polarizer is preferably aligned with the north-south axis of the magnet. A single excitation light beam is divided into four identical beams, two of which are passed through the sheet polarizer and through two fixed polarizing sheets which have their optical axes at right angles to one another. The angle of the compass magnet with respect to a fixed axis of the compass body can be determined by measuring the ratio of the intensities of the two light beams. The remaining ambiguity as to which of the four possible quadrants the magnet is pointing to is resolved by the second pair of light beams, which are passed through the sheet polarizer at positions which are transected by two semicircular opaque strips formed on the sheet polarizer. The incoming excitation beam and the four return beams are communicated by means of optical fibers, giving a remotely readable compass which has no electrical parts.

48647 **Process for measuring degradation of sulfur hexafluoride in high voltage systems.** Sauers, I. (to Dept. of Energy). US Patent Application 6-726,564. 23 Apr 1985. 18p. Contract AC05-84OR21400. DE86013808 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013808.

This invention is a method of detecting the presence of toxic and corrosive by-products in high voltage systems produced by electrically induced degradation of SF_6 insulating gas in the presence of certain impurities. It is an improvement over previous methods because it is extremely sensitive, detecting by-products present in parts per billion concentrations, and because the device employed is of a simple design and takes advantage of the by-prod-

ucts natural affinity for fluoride ions. The method employs an ion-molecule reaction cell in which negative ions of the by-products are produced by fluorine attachment. These ions are admitted to a negative ion mass spectrometer and identified by their spectra. This spectrometry technique is an improvement over conventional techniques because the negative ion peaks are strong and not obscured by a major ion spectra of the SF_6 component as is the case in positive ion mass spectrometry.

48648 **Atmospheric pressure helium afterglow discharge detector for gas chromatography.** Rice, G.; D'Silva, A.P.; Fassel, V.A. (to Dept. of Energy). US Patent Application 6-720,328. 5 Apr 1985. 15p. Contract W-7405-ENG-82. DE86013799 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013799.

An apparatus for providing a simple, low-frequency, electrodeless discharge system for atmospheric pressure afterglow generation. A single quartz tube through which a gas mixture is passed is extended beyond a concentric electrode positioned thereabout. A grounding rod is placed directly above the tube outlet to permit optical viewing of the discharge between the electrodes.

48649 **X-ray holographic microscopy experiments at the Brookhaven synchrotron light source.** Howells, M.R.; Iarocci, M.; Kenney, J.; Kirz, J.; Rarback, H. (Brookhaven National Lab., Upton, NY). **447**: 193-203(1984).

Soft x-ray holographic microscopy is discussed from an experimental point of view. Three series of measurements have been carried out using the Brookhaven 750 MeV storage ring as an x-ray source. Young slits fringes, Gabor (in line) holograms and various data measurements are discussed in terms of the technique for recording them and the experimental limitations in effect. Some discussion is also given of the issues involved in reconstruction using visible light. 19 references, 12 figures, 1 table.

45 EXPLOSIONS AND EXPLOSIVES

4501 Chemical

REFER ALSO TO CITATION(S) 47243, 47350, 48079

48650 **(MLM—3380(OP)) Laser initiation of TiH/sub x//$KClO_4$ (x = 0.2, 0.65, 1.65).** Holy, J.A. (Monsanto Research Corp., Miamisburg, OH (USA)). Jul 1986. Contract AC04-76DP00053. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014700.

A laser initiation system for measuring the ignition properties of pyrotechnics and explosives is described. The laser source is a continuous wave (cw) argon laser operating in the visible wavelength region. A shutter-chopper system converts the cw beam to a pulsed beam. The 514.5 nm line with a chopped pulse width of 3 milliseconds was used to ignite the three pyrotechnic compositions TiH/sub x//$KClO_4$(x = 0.2, 0.65, 1.65). In an argon atmosphere of 0.79 MPa, the ignition thresholds with a focused Gaussian beam diameter of 66 microns were 554, 866, and 657 microjoules for the three respective compositions. The ignition properties of TiH/sub x//$KClO_4$ are found to be strongly dependent on pressure. Rapid changes in the reflectivity of the sample surface also occur within microseconds after application of the laser pulse. 12 refs., 5 figs., 1 tab.

48651 **(SAND—86-2045) Semiconductor bridge (SCB) primary explosive detonator.** Headley, P.S.; Bickes, R.W. Jr. (Unidynamics, Phoenix, AZ (USA); Sandia National Labs., Albuquerque, NM (USA). Initiating and Pyrotechnic Components Div.). Jul 1986. Contract AC04-76DP00789. 25p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014937.

We tested a prototype semiconductor bridge (SCB)/lead azide detonator design. Our tests demonstrated that this prototype is a low energy fast functioning detonator; function times of less than 5 μs were obtained at input energies of approximately 2 mJ. The all-fire current was 8.3 A (1μs current pulse) obtained from a 16 unit Langlie test. The detonator passed critical DoD explosive component requirements including no-fire, ESD and insulation resistance tests. The 5 minute no-fire current was 1.5 A based on a 19 unit Langlie test. Five units were subjected to a pin-to-pin ESD pulse and non initiated. The pin-to-case insulation resistance was 1000 M Omega. We believe these properties of the SCB igniter will be of particular interest for DoD applications or advanced technology in non-nuclear conventional munitions. 11 refs., 4 figs., 5 tabs.

48652 **(UCRL—94857) Experiments with small helical flux compression generators.** Abe, D.K.; Chase, J.B. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 7p. (CONF-860703—25). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014439.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

Lawrence Livermore National Laboratory (LLNL) uses small high explosives driven flux compression generators as power sources for exploding bridgewire loads. To better characterize these generators, a series of experiments using constant impedance loads was performed. These experiments included generators driving purely resistive, purely inductive and short circuited loads. Voltage, current and di/dt waveforms were measured and flash radiographs were taken. 5 refs., 8 figs., 1 tab.

4502 Nuclear

REFER ALSO TO CITATION(S) 48685

48653 **(AD-A—167805/1/XAB) DOD (Department of Defense) nuclear mishaps. Special report.** Reese, H.L. (Armed Forces Radiobiology Research Inst., Bethesda, MD (USA)). Mar 1986. 18p. NTIS, PC A02/MF A01.

This report summarizes Department of Defense nuclear mishaps from 1950 to 1980. The information presented is material available in the public domain at the time of publication.

48654 **(AD-A—167959/6/XAB) Radiation doses from flying through nuclear-debris clouds. Final report, 2-10 January 1985.** Vanden Bosch, P.M. (School of Aerospace Medicine, Brooks AFB, TX (USA)). Apr 1986. 20p. (USAF-SAM-TR—85-86). NTIS, PC A02/MF A01.

Taboada et al. have recently developed a computer model to predict gamma radiation doses to aircrews flying through nuclear-debris clouds. Although the model has the advantages of taking a large number of parameters into account and using the benchmark DELFIC code to model cloud dynamics, it takes up to 20 min for a single run on a mainframe computer. Results from a number of runs have been generalized into empirical formulae. From these results it is possible to estimate worst case gamma radiation doses for complex scenarios using a hand calculator.

48655 **(DOE/DP/50039—T1) US arms control obligations under the Non-Proliferation Treaty.** (Eagle Research Group, Inc., Arlington, VA (USA)). 27 Jun 1986. Contract AC01-84DP50039. 27p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86013943.

Article VI of the 1968 Non-Proliferation Treaty (NPT) obligates the nuclear weapon states parties to the Treaty "to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race, ... to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control." The preamble to the NPT recalls the 1963 Limited Test Ban Treaty "determination ... to achieve the discontinuance of ... explosions." These provisions are interpreted by a majority of the non-nuclear weapon states parties to the Treaty as an obligation of the nuclear weapon states parties to the Treaty to pursue a comprehensive test ban (CTB). However, a review of the history of the NPT negotiations and US ratification proceedings makes clear that the NPT imposes no legal obligation on the US to pursue a CTB. The US did not make a one-to-one correspondence between Article VI and any specific arms control measure; to the contrary, the US argued successfully that such a connection (to any specific measure) would be pernicious to the attempt to achieve agreement on the NPT. This interpretation, which was sustained

through the negotiations and the ratification proceedings, still reflects the limits of the legal obligations the US has accepted. But, in the absence of progress on other arms control measures, which would relieve the pressure for a CTB, the majority interpretation creates political difficulties for the US and could threaten the NPT regime in the future. These problems highlight the need for the US to better defend its compliance with Article VI and to develop a long-term strategy that will permit necessary testing while assuring the survival of the NPT regime in effective form.

48656 **(UCID—20804) Evaluation of the 1983 Rosengren report from the standpoint of a comprehensive test ban (CTB).** Kidder, R.E. (Lawrence Livermore National Lab., CA (USA)). 17 Jun 1986. Contract W-7405-ENG-48. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014747.

An unclassified study by Jack W. Rosengren titled "Some Little-Publicized Difficulties with a Nuclear Freeze" has frequently been cited to substantiate arguments that a Comprehensive Test Ban Treaty (CTBT) would degrade the reliability of the US nuclear deterrent. This paper evaluates the examples cited in the Rosengren report as to whether they support the thesis that nuclear explosive testing is necessary to maintain confidence in the reliability of the existing US stockpile of thoroughly tested nuclear weapons. (ACR)

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

5001 Basic Studies

48657 **(EUR—10353-EN-FR) Measurement of precipitation by radar. Cost project 72. Proceedings.** (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1986. 250p. (CONF-8509315—). Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

From Seminar on an integrated weather radar network for Western Europe; Erice, Italy (30 Sep 1985).

Physical sciences.

Two main topics have been examined, namely the possibilities for standardization of radar equipment for Western Europe, and a study of the feasibility and utility of international exchanges of radar data. Both these aspects are addressed in these proceedings. The proceedings are presented in two sections. Section 1 covers the whole range of work studied by COST-72, and Section 2 deals with individual country status reports.

48658 **(NP—6770135) Initialisation method for numerical mesoscale flow models.** Adrian, G. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Physik). 26 Apr 1985. 121p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86770135.

Initialisation techniques are used for deriving model-consistent initial values from measurements; the values thus obtained may diverge from the measurements in some instances. Initialisation techniques must be tailored to the models used. Of the available initialisation techniques, there are many that lack the function of interpolation and extrapolation in consideration of additional physical information specific to the model. These were originally developed for numerical weather forecasts were the above problems do not apply owing to the different data structure. A special technique of analysis and initialisation was therefore developed for simulating mesoscale flows. (orig./HP).

48659 **Freeze-up and break-up of Lakes as an index of temperature changes during the transition seasons: A case study for Finland.** Palecki, M.A.; Barry, R.G. (Cooperative Institute for Research in Environmental Sciences and Department of Geography, University of Colorado, Boulder, CO 80309). *Journal of Applied Meteorology;* **25**: No. 7, 893-902(Jul 1986).

The statistical relationships between lake freeze-up/lake ice break-up dates and air temperature means over various time periods are analyzed for 63 lakes in Finland. Mean temperatures for the individual months before the lake event dates are strongly correlated with these dates; significant correlations hold for periods up to five months in length before freeze-up. Regression coefficients depend on location, but are consistent within regions. Latitude and distance from the coast are the most important sources of variation in the regression coefficients. The regression coefficients are used to translate changes in lake freeze-up/break-up dates into estimated changes in air temperature. In southern Finland a five day change in freeze-up day would represent a 1.1° C change in November temperature of the same sign. A time series of November temperatures estimated from lake freeze-up dates is derived and compared with observations at Helsinki. The spatial pattern of temperature change over time is also examined using the freeze-up dates. Freeze-up/break-up dates provide a useful proxy for air temperature estimates in data-sparse regions of middle—high latitudes and could permit rapid satellite monitoring of climate perturbations.

48660 **Decreasing diurnal temperature range in the United States and Canada from 1941 through 1980.** Karl, T.R.; Kukla, G.; Gavin, J. (NOAA/National Climatic Data Center, Asheville, NC). *Journal of Climate and Applied Meteorology;* **23**: No. 11, 1489-1504(Nov 1984). Contract AC02-83ER60162.

An appreciable number of nonurban stations in the US and Canada have decreasing trends in the monthly mean diurnal temperature range between 1941-80, at the 90% confidence level. A maximum in the decrease is reached during late summer and early autumn and a minimum in December. Monte Carlo tests indicate that during 5 months the field significance of the decreasing range is above the 99% level and in 12 months above the 95% level. The decrease in diurnal temperature ranges is related to the trend toward increasing temperature in the western part of North America and decreasing temperature in the east. The physical mechanism responsible for the observed decrease in diurnal range is not known. Possible explanations include greenhouse effects such as changes in cloudiness, aerosol loading, atmospheric water vapor content, or carbon dioxide. Change in circulation is also possible, but difficult to isolate because of low spatial coherence. The data further show that the trends in the maximum and minimum temperatures may differ considerable from trends in the mean.

5002 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 47192, 47231, 47246, 47483, 47890, 48092, 48658, 48904

48661 (CONF-841187—Vol.2, pp 573-580) **Comprehensive, integrated, remote sensing at DOE sites.** Lackey, J.G.; Burson, Z.G. (EG & G Energy Measurements, Inc., Las Vegas, NV). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Department of Energy has established a program called Comprehensive, Integrated Remote Sensing (CIRS). The overall objective of the program is to provide a state-of-the-art data base of remotely sensed data for all users of such information at large DOE sites. The primary types of remote sensing provided, at present, consist of the following: large format aerial photography, video from aerial platforms, multispectral scanning, and airborne nuclear radiometric surveys. Implementation of the CIRS Program by EG & G Energy Measurements, Inc. began with field operations at the Savannah River Plant in 1982 and is continuing at that DOE site at a level of effort of about $1.5 m per year. Integrated remote sensing studies were subsequently extended to the West Valley Demonstration Project in this summer and fall of 1984. It is expected that the Program will eventually be extended to cover all large DOE sites on a continuing basis.

48662 (CONF-841187—Vol.2, pp 597-606) **Multispectral remote sensing at the Savannah River Plant.** Shines, J.E.; Tinney, L.R.; Hawley, D.L. (EG & G Energy Measurements, Inc., Las Vegas, NV). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Aerial Measurements Operations (AMO) is the remote sensing arm of the Department of Energy (DOE). The purpose of AMO is to provide timely, accurate, and cost-effective remote sensing data on a non-interference basis over DOE facilities located around the country. One of the programs administered by AMO is the Comprehensive Integrated Remote Sensing (CIRS) program, which involves the use of a wide range of data acquisition systems - aerial cameras, multispectral and infrared scanners, and nuclear detectors - to acquire data at DOE sites. The data are processed, analyzed, and interpreted to provide useful information, which is catalogued into a data base for future use. This report describes some of the data acquisition and analysis capabilities of the Multispectral Remote Sensing Department (MRSD) of AMO as they relate to the CIRS program. Two examples of projects undertaken in support of the CIRS program at the Savannah River Plant site are discussed in detail. The first involves thermal plume analyses and the second the multispectral classification of vegetation along the Savannah River floodplain.

48663 (CONF-8511208—1) Reduction of NOsub(x)-emission of gas-fired furnaces. Pfeiffer, R. (Stuttgart Univ. (Germany, F.R.)). 1985. 24p. (In German). NTIS (US Sales Only), PC A02/MF A01. File Number DE86752565.

From IKE colloquium: reduction of NO/sub x/-emission of gas-fired furnaces; Stuttgart, F.R. Germany (29 Nov 1985).

Natural gas combustion is offering most favourable conditions for nitrogen oxide reduction by means of predominantly primary measures. Secondary measures are advisable only for extremely unfavourably designed gas furnaces. In this case, too, gaseous fuels are convenient due to their quasi-SOsub(x)- and dust-free flue gases.

48664 (DFVLR-FB—86-15) Investigation on acidity-forming ions in wet and dry deposition during the winter season 1984/85. Paffrath, M. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.); Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.). Inst. fuer Physik der Atmosphaere). Mar 1986. 73p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752675.

The concentrations of the most important acidity-controlling ions namely sulphate, nitrate, chloride, H^+ and ammonia were measured systematically in rain, snow, frog and dry depositions in Oberpfaffenhofen and Seefeld between September 1984 and February 1985. The measuring methods are described. The results of the ion concentrations and deposition rates are compared, correlations with the wind direction investigated and discussed. With 29 figs., 26 refs.

48665 (DOE/ER/60397—1) Detection of CO_2-induced climate change. Progress report, 1 December 1985-15 July 1986. Wigley, T.M.L.; Jones, P.D. (East Anglia Univ. (UK). Climatic Research Unit). 15 Jul 1986. Contract FG02-86ER60397. 23p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014035.

The objective is to assemble and analyze present and past instrumental climate data as a basis for detecting CO_2-induced climatic change and for validation of climate models. This report describes progress in the following areas: (1) southern hemisphere temperature data; (2) updating of gridded temperature data; (3) satellite data; (4) marine temperature data sets; (5) analysis of gridded mean sea level pressure data; (6) regional validation of climate models; and (7) detection studies. (ACR)

48666 (EUR—10295-EN) Certification of polycyclic aromatic compounds. Pt. 6. CRM Nos. 152, 265, 266, 267, 268, 269, 270, 271, 272. Jacob, J.; Belliardo, J.J.; Wagstaffe, P.J. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1985. 53p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

BCR information.

The purity of samples of seven polycyclic aromatic hydrocarbons and two nitrogen-containing heterocyclics has been determined in an interlaboratory exercise, involving eleven laboratories of the EC member countries. The purity measurements were carried out using independent analytical methods (gas liquid chromatography, high performance liquid chromatography and mass spectrometry). This report describes the certification procedure and experimental details of the interlaboratory analyses of standard materials for environmental pollutants.

48667 (IIUG-pre—85-10) Smog alarm. Five functions of special emergency measures. Prittwitz, V. (Wissenschaftszentrum Berlin (Germany, F.R.). Internationales Inst. fuer Umwelt und Gesellschaft). 1985. 32p. (In German). NTIS as TIB/B86-08607.

Most environmental policies provide for special emergency measures to be taken during phases of high pollution, such as smog alarm regulations. These measures serve several purposes and can have various impacts. First of all, they act as a warning to those parts of the population immediately threatened by health hazards (Warnfunktion). They may be directed at short-term pollution reduction via pollution abatement measures proscribed during smog alarm situations (unmittelbare Steuerungsfunktion). In addition, the announcement of emergency measures may signal that pollution levels in general have been too high, indicating that the environmental policies normally pursued do not sufficiently or effectively protect human beings and the environment from harm (Signalfunktion). Emergency measures often contain special regulations obliging industrial polluters to switch to costly, less polluting production processes, or to stop production altogether. This may act as an economic incentive to invest in pollution abatement equipment and non-polluting production processes (Anreizfunktion). Finally, these emergency measures may cause doubts among the public to be raised about the purported 'inevitability' of environmental pollution, since temporarily switching over to less polluting activities is itself a demonstrative example for the feasibility of environmentally less harmful production methods (Beispielsfunktion). In this paper, the various functions of policy measures taken during phases of high pollution are described and analyzed, giving special consideration to the smog alarm regulations in the Federal Republic of Germany.

48668 (N—86-23088) SAGE Aerosol Measurements. Volume 2: 1 January-31 December 1980. Mccormick, M.P. (National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center). Jan 1986. 310p. (NASA-RP—1149; L—16028). NTIS, PC A14/MF A01.

The stratospheric Aerosol and Gas Experiment (SAGE) satellite system, launched on February 18, 1979, provides profiles of aerosol extinction at wavelengths of 1.00 and 0.45 micron, ozone concentration, and nitrogen dioxide concentration. Data taken during sunset events in the form of zonal averages and seasonal averages of the aerosol extinction at 1.00 and 0.45 micron, ratios of the aerosol extinction to the molecular extinction at 1.00 micron, and ratios of the aerosol extinction at 0.45 micron to the aerosol extinction at 1.00 micron are presented. The averages for 1980 are shown in tables and in profile and contour plots (as a function of altitude and latitude). In addition, temperature data provided by the National Oceanic and Atmospheric Administration (NOAA) for the time and location of each SAGE measurement are averaged and shown in a similar format.

48669 (N—86-23138) Spectral studies related to dissociation of HBr, HCl and BrO. Final Technical Report. Ginter, M.L. (Maryland Univ., College Park (USA)). Mar 1986. 92p. (NASA-CR—176698). NTIS, PC A05/MF A01.

Concern over halogen catalyzed decomposition of O_3 in the upper atmosphere has generated need for data on the atomic and molecular species X, HX and XO (where X is Cl and Br). Of special importance are Cl produced from freon decomposition and Cl and Br produced from natural processes and from other industrial and agricultural chemicals. Basic spectral data are provided on HCl, HBr, and BrO necessary to detect specific states and energy levels, to enable detailed modeling of the processes involving molecular dissociation, ionization, etc., and to help evaluate field experiments to check the validity of model calculations for these spe-

cies in the upper atmosphere. Results contained in four published papers and two major spectral compilations are summarized together with other results obtained.

48670 **(N—86-25911) Present state of knowledge of the upper atmosphere: an assessment report; processes that control ozone and other climatically important trace gases.** Watson, R.T.; Geller, M.A.; Stolarski, R.S.; Hampson, R.F. (National Aeronautics and Space Administration, Washington, DC (USA)). May 1986. 149p. (NASA-RP—1162). NTIS, PC A07/MF A01.

The state of knowledge of the upper atmosphere was assessed as of January 1986. The physical, chemical, and radiative processes which control the spatial and temporal distribution of ozone in the atmosphere; the predicted magnitude of ozone perturbations and climate changes for a variety of trace gas scenarios; and the ozone and temperature data used to detect the presence or absence of a long term trend were discussed. This assessment report was written by a small group of NASA scientists, was peer reviewed, and is based primarily on the comprehensive international assessment document entitled Atmospheric Ozone 1985: Assessment of Our Understanding of the Processes Controlling Its Present Distribution and Change, to be published as the World Meteorological Organization Global Ozone Research and Monitoring Project Report No. 16.

48671 **(PB—86-190246/XAB) Practical guide - trial burns for hazardous-waste incinerators. Final report, 1984-1985.** Gorman, P.; Hathaway, R.; Wallace, D.; Trenholm, A. (Midwest Research Inst., Kansas City, MO (USA)). Apr 1986. 75p. NTIS, PC A04/MF A01.

The manual concentrates on those aspects of a trial burn that are the most important and those that are potentially troublesome. The manual contains practical explanations based on experience of Midwest Research Institute (MRI) and others in conducting trial burns and related tests for EPA. It includes the comments of several industrial plant owners and operators. It is directed mainly to incinerator operators, those who may conduct the actual sampling and analysis, and those who must interpret trial-burn results. It will also be useful for regulatory personnel and others that need to understand trial burns. Potential trouble spots that have been encountered are: (1) trial burns frequently take more time and effort than an operator anticipates; and (2) failure to meet the trial-burn requirements.

48672 **(PB—86-208360/XAB) Global atmospheric background monitoring for selected environmental parameters: BAPMON data for 1981: Volume 2. Precipitation chemistry, continuous atmospheric carbon dioxide, and suspended particulate matter.** (Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Monitoring and Systems Lab.). Jun 1985. 201p. (EPA/600/4—85/015). NTIS, PC A10/MF A01.

The report is the seventh in series reporting precipitation data from stations participating in the World Meterological Organization's network. The report consists of tables of raw data received from network sites around the world.

48673 **Use of a toxic and hazardous aerosol research facility to evaluate fate and effects of army smoke screen materials.** Van Voris, P.; Ligotke, M.W.; McFadden, K.M.; Cataldo, D.A.; Garland, T.R. (Pacific Northwest Lab., Richland, WA). pp 3-8 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—). Contract AC06-76RL01830.

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

Aerosols are generated and injected into a new specialized wind tunnel that can reproduce a range of environmental conditions. The wind tunnel is part of the Toxic and Hazardous Aerosol Exposure Facility (T/HAEF) located at Pacific Northwest Laboratory on the Department of Energy's Hanford Site in Richland, Washington. The T/HAEF is designed for total containment (P-3 rated) and houses a sealed, negative pressure, recirculating wind tunnel, controlled environment chambers, microcomputer and an analytical support laboratory. The facility offers a unique ability to conduct aerosol research in a dynamic environment simulating natural field conditions. Wind speeds from 0.2 to 30.0 m/s (65 mph), temperatures between 0 and 45°C, and relative humidities from 20% to 95% with mist and rainfall simulation are controlled and programmable through the microcomputer system. The T/HAEF enables researchers to evaluate physical and chemical interactions along with biological and environmental fate and effects of both aerosols and gases. Research currently being performed in this facility and presented in this paper evaluates the environmental fate and effects of various smokes used by the US Army throughout the United States to screen both troop and track vehicle movements during training.

48674 **Aerosol simulation including chemical and nuclear reactions.** Marwil, E.S.; Lemmon, E.C. (EG&G Idaho, Inc., Idaho Falls, ID). pp 446-451 of Proceedings of the 1985 summer computer simulation conference. San Diego, CA; Society for Computer Simulation (1985). (CONF-850709—).

From National computer conference; Chicago, IL, USA (22 Jul 1985).

The numerical simulation of aerosol transport, including the effects of chemical and nuclear reactions, presents a challenging dynamic accounting problem. Particles of different sizes agglomerate and settle out due to various mechanisms, such as diffusion, diffusiophoresis, thermophoresis, gravitational settling, turbulent acceleration, and centrifugal acceleration. Particles also change size, due to the condensation and evaporation of materials on the particle. Heterogeneous chemical reactions occur at the interface between a particle and the suspending medium, or a surface and the gas in the aerosol. Homogeneous chemical reactions occur within the aerosol suspending medium, within a particle, and on a surface. These reactions may include a phase change. Nuclear reactions occur in all locations. These spontaneous transmutations from one elemental form to another occur at greatly varying rates and may result in phase or chemical changes which complicate the accounting process. This paper presents an approach for inclusion of these effects on the transport of aerosols. The accounting system is very complex and results in a large set of stiff ordinary differential equations (ODEs). The techniques for numerical solution of these ODEs require special attention to achieve their solution in an efficient and affordable manner.

48675 **Transformation processes and wet deposition on the urban scale.** Patrinos, A.A.N.; Tanner, R.L.; Brown, R.M. (Brookhaven National Lab., Upton, NY). pp 224-227 of Fourth joint conference on applications of air pollution meteorology. Boston, MA; American Meteorology Society (1984). Contract AC02-76CH00016.

From 4. joint conference on applications of air pollution meteorology; Portland, OR, USA (15-19 Oct 1984).

This paper presents preliminary results from a study addressing the potential contribution of urban emissions to the total acid wet deposition load downwind of a large city and the spatial variability of this deposition on the surburban-rural scale. Among the candidate cities along the northeastern corridor, Philadelphia was chosen as a test site because it has substantial and well-documented emissions and because it is sufficiently inland to minimize complications from a purely coastal location. Emphasis was placed on frontal-type precipitation; according to one estimate (Raynor and Hayes, 1979) cyclonic storms account for the largest portion (> 60%) of wet deposition in the northeastern US. The Philadelphia field study involved the sampling of two precipitation events during fall 1983, and an intensive sampling period (March-April 1984) during which nine storms were sampled. Preliminary results from the fall expeditions were given in the paper by Patrinos and Brown (1984). This paper also concentrates on the 1983 results. 12 references, 5 figures.

5003 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 47325, 47330, 47331, 47332, 47335, 47718, 47730, 47731, 47732, 47733, 47734, 47740, 48071, 48114, 48127, 48227, 48559, 48586, 48587, 48589, 48591, 48661, 48716, 48718, 48720, 48721, 48723, 48774, 48827

48676 **(AERE-R—11915) Radioactive fallout in air and rain: results to the end of 1984.** Cambray, R.S.; Playford, K.; Lewis, G.N.J. (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). Oct 1985. 23p. H.M. Stationery Office, London, price Pound 4.00.

Samples of atmospheric particulate and rainwater have been collected from the United Kingdom and elsewhere. Results are presented of analyses of these samples for various fission products and certain other radionuclides. The average concentrations of long-lived fission products in air and rain in the United Kingdom in 1984 were near to or below the limit of detection and lower than at any time since measurements began in 1953. Plutonium concentrations in air and rainwater generally follow the pattern of long-lived fission product=s and are a very small fraction of the NRPB's Generalised Derived Limit for members of the public. In the southern hemisphere the mean concentration of caesium-137 in air in 1984 was similar to that in 1983 and near to or below the limit of detection. The estimated cumulative worldwide deposits of caesium-137 and strontium-90 at the end of 1983 show a small decrease compared with 1982 and continue to be some 15% below the peak levels of 1965. The annual deposits in 1982 and 1983 were below the limit of detection. The gamma and beta-ray dose rates from fallout at Chilton are estimated from the observed deposition.

48677 (CONF-841187—Vol.1, pp 247-254) **Decline of airborne plutonium following decommissioning of a liquid waste disposal ditch in the Hanford Site 200 Area.** Elder, R.E. (Rockwell Hanford Operations, Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The 216-Z-19 Ditch, a low-level liquid waste disposal site in the Hanford Site 200 West Area, received multigram quantities of / sup 239,240/Pu during its 10-year service history (1971 to 1981). Since 1977 there has been an ambient air sampler stationed near the head end of the ditch. This station consistently measured elevated levels of /sup 239,240/Pu (ranging from a concentration of 0.003 to 0.044 picocurie per cubic meter (pCi/m^3) with an average of 0.015 pCi/m^3). Resuspension of the plutonium in the ditch soil was determined to be the source of these elevated levels. Through the use of temporary, site-specific air sample stations near the ditch, it was determined that these levels were limited to the head end of the ditch. Following decommissioning and burial of the ditch, the levels of plutonium in air declined to less than 1% of their former levels and are now at Hanford background levels (approximately 0.00008 pCi/m^3). 7 references, 3 figures, 1 table.

48678 (CONF-841187—Vol.1, pp 307-320) **Evaluation of analytical results on DOE Quality Assessment Program Samples.** Jaquish, R.E.; Kinnison, R.R.; Mathur, S.P.; Sastry, R. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Criteria were developed for evaluating the participants analytical results in the DOE Quality Assessment Program (QAP). Historical data from previous QAP studies were analyzed using descriptive statistical methods to determine the interlaboratory precision that had been attained. Performance criteria used in other similar programs were also reviewed. Using these data, precision values and control limits were recommended for each type of analysis performed in the QA program. Results of the analysis performed by the QAP participants on the November 1983 samples were statistically analyzed and evaluated. The Environmental Measurements Laboratory (EML) values were used as the known values and 3-sigma precision values were used as control limits. Results were submitted by 26 participating laboratories for 49 different radionuclide media combinations. The participants reported 419 results and of these, 350 or 84% were within control limits. Special attention was given to the data from gamma spectral analysis of air filters and water samples. both normal probability and box plots were prepared for each nuclide to help evaluate the distribution of the data. Results that were outside the expected range were identified and suggestions made that laboratories check calculations, and procedures on these results.

48679 (CONF-841187—Vol.1, pp 353-386) **Atmospheric transport calculations versus measured tritium concentrations.** Miltenberger, R.P.; Tichler, J.L.; Day, L.E.; Steimers, J.P. (Brookhaven National Lab., Upton, NY). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Elevated airborne tritium concentrations were detected at the BNL site boundary through the routine environmental monitoring program. These air concentrations suggested an unexpected increase in the last 3 years over the air concentrations collected in 1979 and 1980. Major effluent release points were examined and an existing atmospheric transport model was used to calculate expected concentrations at sample stations based on known releases. In this report, the basis of the problem, the atmospheric model, the sampling protocol and the current status of the monitoring effort are discussed. 17 references, 23 figures, 3 tables.

48680 (CONF-841187—Vol.2, pp 581-595) **Aerial radiological monitoring survey Savannah River Plant.** Jobst, J.E.; Boyns, P.K. (EG & G Energy Measurements, Inc., Las Vegas, NV). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Anaerial radiological survey of the Savannah River Plant was conducted by EG & G for the US Department of Energy. The survey dates were August 2 to August 31, 1982. A survey was also conducted from July through October 1983 to determine the level of man-made isotopes deposited in the Savannah River Floodplain. The survey covered over 8000 line-miles between Augusta and Savannah, Georgia. Airborne measurements were obtained for both natural and man-made gamma radiation over the Plant and surrounding areas. These data were used to determine surface terrestrial spatial distributions of isotopes for cobalt-60 and cesium-137. Selected distribution maps for these isotopes are superimposed on site photographs and maps. Detailed cesium-137 contours are presented for Steel Creek.

48681 (CONF-841187—Vol.2, pp 643-654) **Continuous vent sampler for monitoring radionuclide emissions.** Orlett, M.J. (Goodyear Atomic Corp., Piketon, OH). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Substantially more restrictive regulatory limits than those now in effect for airborne radioactive discharges are possible in the future. The principal contributors to such discharges at the Portsmouth Gaseous Diffusion Plant are uranium isotopes - mainly uranium-234 - and technetium-99, both of which are present in very low concentrations in the vent gases discharged to the atmosphere from the diffusion process. If proposed stricter regulations are enacted, monitoring of vent gases for compliance would require detection limits of 0.001 ppm for uranium and technetium - an order of magnitude lower than present requirements. The conventional method at Portsmouth for sampling airborne discharges utilizes grab samples which are taken manually several times each day and then analyzed for uranium and technetium. This procedure, however, is impractical for meeting the limits of uranium detection that may be required by possible future regulations, nor does it provide continuous monitoring of the emissions. A prototype vent gas sampler which overcomes these limitations has been designed, constructed, placed in operation, and evaluated for accuracy and reliability. A small, automatically measured flow of vent gas is continuously withdrawn and passed through three small traps in series containing activated alumina, which quantitatively collects the uranium and technetium. The sample flow is maintained until a sufficient quanti-

ty of the radionuclides is collected to allow detection within the requisite limits using established laboratory methods.

48682 (CONF-841187—Vol.2, pp 655-661) **Ambient krypton-85 air sampling at Hanford.** Trevathan, M.S.; Price, K.R. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

In the fall of 1982, the Environmental Evaluations Section of Pacific Northwest Laboratory (PNL) initiated a network of continuous ^{85}Kr air samplers located on and around the Hanford Site. This effort was in response to the resumption of operations at a nuclear fuel reprocessing plant located onsite where ^{85}Kr was to be released during fuel dissolution. Preoperational data were collected using noble gas samplers designed by the Environmental Protection Agency-Las Vegas (EPA-LV). The samplers functioned erratically resulting in excessive maintenance costs and prompted a search for a new sampling system. State-of-the-art ^{85}Dr sampling methods were reviewed and found to be too costly, too complex and inappropriate for field application, so a simple bag collection system was designed and field tested. The system is composed of a reinforced, heavy plastic bag, connected to a variable flow pump and housed in a weatherproof enclosure. At the end of the four week sampling period the air in the bag is transferred by a compressor into a pressure tank for easy transport to the laboratory for analysis. After several months of operation, the air sampling system has proven its reliability and sensitivity to ambient levels of ^{85}Kr.

48683 (CONF-841187—Vol.2, pp 663-671) **Environmental monitoring program interaction between the West Valley Demonstration Project and New York State agencies.** Picazo, E.D.; Englert, J.P.; Adams, T.G.; Wilcox, D.P. (Dames and Moore, West Valley, NY). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

With the 1982 initiation of the West Valley Demonstration Project (WVDP) and the takeover of most of the facilities at the Western New York Nuclear Service Center (WNYNSC) by the US Department of Energy, the working relationship between the site operator and state regulatory agencies changed significantly. An upgrading of the environmental monitoring program by the Department of Energy (DOE) contractor West Valley Nuclear Services Company was concurrent with a change in New York State departmental responsibility for monitoring of the site environs. An agreement was reached between DOE and New York State which allowed more efficient use of available manpower for collection of samples, such as game animals and other biological media, as well as routine air and water samples potentially affected by site effluents. Additionally, the State has contributed significantly to WVDP wildlife and land-use surveys. These surveys produced valuable data for use in preparing safety analysis reports and dose assessments for the annual environmental monitoring summaries. During the past year, there were two occurrences which had the potential of raising public concerns about release of radioactivity to uncontrolled areas. In both cases there was excellent cooperation between Project personnel and state agencies in conducting a rapid investigation. Site interaction with state agencies regulating nonradiological effluents under the State Pollution Discharge Elimination System (SPDES) also has been characterized by effective communication and cooperation.

48684 (DOE/DP/00539—056) **Off-site environmental monitoring report. Radiation monitoring around United States nuclear test areas, calendar year 1985.** Grossman, R.F.; Black, S.C.; Dye, R.E.; Smith, D.D.; Thome, D.J.; Mullen, A.A. (comps.). (Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.). Apr 1986. Contract AI08-76DP00539. 154p. (EPA—600/4-86/022). NTIS, PC A08/MF A01; GPO Dep. File Number DE86014406.

The EMSL-LV operates an Off-Site Radiological Safety Program around the NTS and other sites as requested by the Department of Energy (DOE) under an Interagency Agreement between DOE and EPA. This report, prepared in accordance with DOE guidelines (DOE85a), covers the program activities for calendar year 1985. It contains descriptions of pertinent features of the NTS and its environs, summaries of the EMSL-LV dosimetry and sampling methods, analytical procedures, quality assurance, and the analytical results from environmental measurements. Where applicable, dosimetry and sampling data are compared to appropriate guides for external and internal exposures of humans to ionizing radiation.

48685 (DOE/DP/00539—057) **Off-site monitoring for the Mighty Oak nuclear test.** Black, S.C.; Smith, A.E.; Costa, C.F. (Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.). Jul 1986. Contract AI08-76DP00539. 19p. (EPA—600/4-86-030). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014090.

After a nuclear explosives test, code name Mighty Oak, the tunnel leading to the test point became contaminated with radioactive debris. To re-enter and recover valuable equipment and data, the DOE purged the tunnel air using particulate and charcoal filters to minimize discharge of radioactivity to the atmosphere. During this purging, the EPA established special air samples supplementing their routine air monitoring networks. Analysis of the collected samples for radioactive noble gases and for gamma-emitting radionuclides indicated that only low levels of xenon-133 were released in amounts detectable in populated areas near the Nevada Test Site. The maximum dose to an individual was calculated to be 0.36 microrem, assuming that person remained in the open field at the measurement site during the whole period of the purging.

48686 (INIS-mf—10174, pp XI/56) **^{14}C level 25 years after atmospheric test series.** Nydal, R. (Radiological Dating Laboratory. The Norwegian Institue of Technology, Trondheim, Norway). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48687 (INIS-mf—10174, pp XIII/85) **Natural neutron background in localities of various altitude.** Florek, M.; Holy, K.; Szarka, I. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48688 (INIS-mf—10174, pp XVIII/103) **^{7}Be in the troposphere.** Beseova, G.; Chudy, M.; Pisutova, N.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48689 (INIS-mf—10174, pp XVIII/105) **Comparison of methods for collection and preconcentration of radionuclides in atmospheric precipitations.** Jansta, V.; Virdzek, S.; Navarcik, I. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48690 (INIS-mf—10174, pp XVIII/106) **Anthropogenic radiocarbon in the atmosphere.** Povinec, P.; Sivo, A.; Chudy, M.; Burchuladze, A.A.; Pagava, S.V.; Togonidze, G.; Eristavi, I. (Komenskeho Univ., Bratislava, Czechoslovakia; Tbilisskij Gosudarstvennyj Univ., USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48691 (INIS-mf—10174, pp XVIII/108) **Method for the determination of ^{125}I in air by collecting on the polyurethane foam.** Palagyi, S.; Balgava, V.; Polanyiova, A.; Nezkusilova, T. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48692 (INIS-mf—10174, pp XIX/118) **Anthropogenic radionuclides ^{3}H, ^{14}C, ^{85}Kr and ^{133}Xe in the atmosphere.** Cimbak, S.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48693 (INIS-mf—10174, pp XIX/119) **Measurement of airborne C-14.** Juznic, K.; Kobal, I. (Institut Jozef Stefan, Ljubljana, Yugoslavia; Ljubljana Univ., Yugoslavia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48694 (INIS-mf—10174, pp XIX/120) **^{85}Kr as a monitor of global nuclear fuel cycle strategy.** Dvorak, Z.; Wilhelmova, L. (Ceskoslovenska Akademie Ved, Prague. Ustav Radiologicke Dozimetrie). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48695 (INIS-mf—10174, pp XIX/121) **Improved method for the measurement of the atmospheric Kr-85 activity.** Janssens, A.; Buysse, J.; Raes, F.; Varmarcke, H. (Ghent Rijksuniversiteit, Belgium. Lab. voor Kernfysica). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48696 (INIS-mf—10174, pp vp) **Black Sea region with anomalously low gamma-radiation background.** Minev, L.; Teofilov, S.; Uzunov, I.; Kritidis, P. (Sofia Univ., Bulgaria. Katedra po Atomna Fizika; National Research Foundation, Athens, Greece). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48697 (INP—1162/D) **Assessment of the radiation risk following from exploitation of Polish brown coals. Part 1. Brown coal in Polish industry; preparation of the method of determining the concentrations of main natural radioisotopes appearing in brown coal and its combustion products.** Jasinska, M.; Niewiadomski, T.; Schwabenthan, J. (Institute of Nuclear Physics, Krakow (Poland)). 1982. 31p. (In Polish). NTIS (US Sales Only), PC A03/MF A01. File Number DE86703162.

Poland is rich in deposits of brown coal applicable for large-scale industry. These deposits are estimated at about $13.5.10^{9}$ tons. In the near future, one-half of the electric power produced in Poland will be generated by power plants using brown coal. As a result, the yearly burden of the environment in Poland will amount to about 15.10^{6} tons of ashes and slag, and about $0.79.10^{6}$ tons of fly ash emitted into the atmosphere. Concentrations of radioactive elements in wastes following from the use of brown coal may in some cases be as much as 12 times higher that occuring from combustion products of lignite coal. Distribution of these wastes to the environment affects the population, through inhalation of fly-ashes, consumption of radioactively contaminated products and through living in dwellings constructed of building materials produced using industrial wastes. In order to determine the concentrations of ^{226}Ra, ^{232}Th and ^{40}K in brown coal and in products of its combustion, the method of identifying these elements through gamma-spectrometry has been prepared. Concentrations of ^{210}Pb and ^{210}Po will be determined using the method of electrodeposition on metallic silver, which has been tested in the laboratory.

48698 **(PPA-T—13) Environmental survey at the Tun Ismail Atomic Research Centre (PUSPATI), Bangi, Malaysia. Results for 1980-1981.** Lau How Mooi. (Unit Tenaga Nuklear, Bangi, Selangor (Malaysia)). Nov 1981. 80p. Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia.

This report contained the results of the preoperational environmental monitoring, which was started mid 1980. Due to some problems with some detectors, only results from January to June, 1981 were reported in this paper. Only gross gamma and gamma spectrometric measurements were reported here. The gross beta and alpha measurements were reported elsewhere. The ecological study and the river biology study which were done by the National University and the Agriculture University respectively were also reported elsewhere.

48699 **(SCPRI-RM—4-1985) Monthly results of measurements, April 1985.** (Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France)). May 1985. 31p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750873.

Measurement tables concerning the surveillance of the environment in France.

48700 **(SCPRI-RM—5-1985) Monthly results of measurements, May 1985.** (Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France)). Jun 1985. 32p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750874.

Measurement tables concerning the surveillance of the environment in France.

48701 **(SCPRI-RM—6-1985) Monthly results of measurements, June 1985.** (Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France)). Jul 1985. 46p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750875.

Measurement tables concerning the surveillance of the environment in France with supplement related to the three months, April, May, June 1985.

5006 Regulations

REFER ALSO TO CITATION(S) 47777, 48228, 48666

48702 (CONF-841187—Vol.1, pp 9-19) **Environmental regulation of federal facilities.** Hirsch, A. (Environmental Protection Agency, Washington, DC). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

New and anticipated developments across all EPA media that might affect DOE, as well as the plans and programs of the Office of Federal activities are discussed. Attention is focused on two of the direct responsibilities of the Office of Federal Activities. These are: ensure the federal government shows leadership in environmental control practices through Federal facility compliance with air, water, toxics, and hazardous wastes requirements; and thoroughly review the projected environmental impacts of proposed Federal projects and regulations under Section 309 of the Clean Air Act. Federal agencies have made significant progress in providing facilities for control of conventional air emissions and water discharges; however, there is a need for more emphasis on compliance monitoring, on proper operation and maintenance of facilities, and on timely expansion of these facilities to meet increased capacity needs. The more pressing environmental problem relating to hazardous waste are discussed in detail.

48703 (CONF-841187—Vol.1, pp 20-22, 22a-22b) **OOS Environmental Program missions and objectives.** Frangos, T.G. Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

5101 Basic Studies

REFER ALSO TO CITATION(S) 47643, 48823, 48946

48704 **(CONF-8605167—1) Nitrogen cycling models and their application to forest harvesting.** Johnson, D.W.; Dale, V.H. (Oak Ridge National Lab., TN (USA). Environmental Sciences Div.). 1986. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013410.

From Workshop on forest crop nutrition: production, prices and pathways; Kingston, Ontario, Canada (20 May 1986).

The characterization of forest nitrogen- (N-) cycling processes by several N-cycling models (FORCYTE, NITCOMP, FORTNITE, and LINKAGES) is briefly reviewed and evaluated against current knowledge of N cycling in forests. Some important processes (e.g., translocation within trees, N dynamics in decaying leaf litter) appear to be well characterized, whereas others (e.g., N mineralization from soil organic matter, N fixation, N dynamics in decaying wood, nitrification, and nitrate leaching) are poorly characterized, primarily because of a lack of knowledge rather than an oversight by model developers. It is remarkable how well the forest models do work in the absence of data on some key processes. For those systems in which the poorly understood processes could cause major changes in N availability or productivity, the accuracy of model predictions should be examined. However, the development of N-cycling models represents a major step beyond the much simpler, classic conceptual models of forest nutrient cycling developed by early investigators. The new generation of computer models will surely improve as research reveals how key nutrient-cycling processes operate.

5102 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 48060, 48091, 48673, 48678, 48683, 48743, 48908

48705 **(AD-A—167741/8/XAB) Installation restoration program: Phase I. Records search, Lawndale Annex, California. Final report, 1 July 1985-31 January 1986.** Hendry, C.D.; Pandorf, W.; Doolittle, J.; McNeill, D.F.; Stewart, M.D. (Environmental Science and Engineering, Inc., Gainesville, FL (USA)). Apr 1986. 135p. NTIS, PC A07/MF A01.

Past and current employees were interviewed, records were reviewed, regulatory agencies were contacted, and a ground reconnaissance was conducted. Past waste-handling and disposal practices were evaluated, and two past waste-disposal sites were identified. The sites were evaluated using a decision-tree process. Both sites were found to have no potential for contaminant migration or endangerment of human health or environmental quality; therefore no Phase II actions are recommended. Both sites were referred to the base environmental program for investigation.

48706 **(AD-A—167798/8/XAB) Installation restoration program. Phase II. Confirmation/quantification. Stage I report for Williams Air Force Base, Chandler, Arizona. Final report, September 1984-January 1986.** (AeroVironment, Inc., Monrovia, CA (USA)). 24 Jan 1986. 318p. NTIS, PC A14/MF A01.

AeroVironment Inc. was tasked to conduct a Phase II Stage I investigation at Williams AFB, near Phoenix, AZ. The objective was to confirm and to quantify the presence and extent of contamination at the fire protection training area 2 (FPTA), liquid fuels storage area (LFSA), surface drainage system - southwest, landfill, pesticide burial area, and surface drainage system - northwest. Drilling and soil sampling were conducted at the FPTA, FLSA, and landfill. Thirty-one holes were drilled in the three areas. Surface soil samples were collected along the two drainage channels. Also, a magnetometer survey was conducted at the pesticide burial area. A total of 272 samples were collected. Of the 272 samples collected, 204 were analyzed in the laboratory. Soil contamination was found at: 1) small burn pit at FPTA, 2) drainage outfall at FPTA, 3) old AVGAS distribution system at LFSA, and 4) southwest drainage system. Magnetic anomalies (buried drums) were identified at the pesticide burial area. Recommendations made for Williams include: 1) remove surface soils from the southwest drainage, 2) excavate and inspect the identified buried materials at the pesticide disposal area, 3) collect additional samples around contamination at the FPTA and LFSA.

48707 **(OEFZS—4356) Determination of total sulphur in soil - a comparison of methods.** Gerzabek, M.H.; Schaffer, K. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Landwirtschaft). Apr 1986. 7p. (In German). (LA—154/86). Special print from Bodenkultur (February 1986) v. 37(1) p. 1-6.

The following paper deals with the comparison of two methods for total-sulfur measurement in soils. The two methods (oxidation of total-S with a mixture of $NaNO_3/KNO_3$ and turbidimetric determination of SO_4^{2-}-S, and S-measurement with the Sulfur Determinator SC 132, Leco Corp.) show a clear correlation ($r=0.68++$, $y=50.15 + 0.23 x$), but the Sulfur Determinator records 40% of the turbidimetrically determined sulfur-content only.

48708 **(PB—86-208733/XAB) Avoiding failure of leachate-collection and cap-drainage systems. Report for September 1983-November 1985.** Bass, J.M. (Little (Arthur D.), Inc., Cambridge, MA (USA)). Jun 1986. 143p. NTIS, PC A07/MF A01.

Failure, caused by a variety of mechanisms, is common to drainage systems of all kinds. Leachate-collection and cap-drainage systems, which remove excess liquid from hazardous-waste land-disposal facilities, are no exception. Failure of these systems, however, may be a greater cause for concern than failure, for example, of agricultural drainage systems. This is especially true for leachate-collection systems at hazardous-waste-disposal facilities. Undetected failures may cause leachate to build up on top of the liner. This can lead to failure of the liner system and contamination of groundwater.

48709 **Nuclear magnetic resonance spectroscopy of soils and related materials. Relaxation of ^{13}C nuclei in cross polarization nuclear magnetic resonance experiments.** Wilson, M.A.; Pugmire, R.J.; Grant, D.M. (Univ. of Utah, Salt Lake City). 5: No. 3, 121-129(1983). Contract FG22-82PC50812.

Relaxation of carbon-13 nuclei in a peat, a soil, and three soil fractions was investigated in order to improve structural resolution and to investigate quantification of various carbon types. Rotating-frame spin-lattice relaxation times and transverse relaxation times are similar to those observed for coals. The rotating-frame relaxation times of carbons in different magnetic environments differ sufficiently that spectra can be obtained containing only nonprotonated carbon and methyl substituents if a 40-microsecond delay without decoupling is inserted into the pulse program before data acquisition (dipolar dephasing). Provided quantitative data is obtained in simple cross-polarization experiments and allowance is made for loss in signal intensity of nonprotonated carbon during dipolar dephasing, then the fraction of aromatic carbon which is protonated in the samples can be determined.

5103 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 47303, 47313, 47316, 47325, 47329, 47332, 47333, 47335, 47336, 47338, 48069, 48070, 48093, 48439, 48546, 48559, 48684, 48698, 48699, 48700, 48701, 48780

48710 **(BMI—1985-092) Increase of local dose rates on the islands in the North Sea, resulting from heavy mineral accumulation. Final report.** Bonka, H. (Bundesministerium des Innern, Bonn (Germany, F.R.)). Dec 1985. 69p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752611.

Schriftenreihe Reaktorsicherheit und Strahlenschutz. Ergebnisberichte, Untersuchungen, Studien, Gutachten.

The report shows that there is considerable accumulation of heavy minerals in sands at various places at the beach of the North and East Frisians. The process is induced by the effects of wind and water. Formation of coastal placer deposits of heavy minerals has been known since the last century. U-238 and Th-232 contents in the heavy sand grains that stem from the glacial till are quite high at some places, which results in local dose rates from gamma radiation that are higher than otherwise usual in Northern Germany, and are changing every year as a result of wind and water effects. The highest local dose rates measured at 1 m above ground were about 0.3 μSv (30 μrem/h) on the islands of Norderney and Sylt. At ground level, local dose rates on Norderney were as high as 0.6 μSv/h (60 μrem/h). The highest U-238 activity concentration measured was about 18 pCi/g, and for Th-232 about 30 pCi/g. The different relationship of radioactivity concentrations of U-238 and Th-232 in the sands of the North and East Frisians reflects the different origin of the sands.

48711 (CONF-841187—Vol.1, pp 197-206) **Assessment of alternatives for long-term management of uranium ore residues and contaminated soils located at DOE's Niagara Falls Storage Site.** Merry-Libby, P. (Argonne National Lab., IL). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract W-31-109-ENG-38.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

About 11,000 m^3 of uranium ore residues and 180,000 m^3 of slightly contaminated soils (wastes) are consolidated within a diked containment area at the Niagara Falls Storage Site located about 30 km north of Buffalo, New York. The residues account for less than 6% of the total volume of contaminated materials but almost 99% of the radioactivity. The average radium-226 concentration in the residues is 67,000 pCi/g. The US Department of Energy is considering several alternatives for long-term management of the wastes and residues, including: improvement of the containment at NFSS, modification of the form of the residues, management of the residues separately from the wastes, management of the wastes and residues at another humid site (Oak Ridge, Tennessee) or an arid site (Hanford, Washington), and dispersal of the wastes in the ocean. Potential radiological risks associated with implementation of any of the alternatives are expected to be smaller than the nonradiological risks of occupational and transportation-related injuries and deaths. Dispersal of the slightly contaminated wastes in the ocean is not expected to result in any significant radiological risk to humans. The residues and wastes will remain hazardous for thousands of years. After controls cease, the radioactive materials will eventually be dispersed in the environment. Loss of the earthen covers over the buried materials is predicted to occur from several hundred to more than two million years, depending primarily on the use of the land surface. Groundwater will eventually be contaminated in all alternatives; however, the groundwater pathway is relatively insignificant with respect to radiological risks to the general population. 2 references, 2 figures, 6 tables.

48712 (CONF-841187—Vol.2, pp 673-683) **Fermilab soil activation experience.** Baker, S.I. (Fermi National Accelerator Lab., Batavia, IL). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Soil borings were made at Fermilab locations of highest soil activation and samples analyzed to determine whether or not any leached radionuclides were moving toward the aquifer under the site. One boring extended underneath the primary target in the Neutrino Area, a target which has received most of the protons produced by the accelerator. The other recent boring was adjacent to the thinly shielded abort system which received protons which were improperly transported through the accelerator magnets or left in the accelerator after proton beam extraction. No evidence was found for movement of radionuclides toward the aquifer in concentrations approaching the community drinking water supply standards.

48713 **(EUR—10364-EN) Additional certification of the content (mass fraction) of iodine in two spiked samples of skim milk powder. CRM No. 150-151.** Griepink, B. (Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation). 1986. 16p. Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities.

BCR information. Addition to report EUR-9251-EN (1984).

This report describes the additional certification of the iodine content in two skim milk powder reference materials, which are previously certified (Report EUR 9251) for their contents of Cd, Cu, Fe, Hg and Pb. The analyses were made using various independent methods applied by different laboratories. The results are given in detail.

48714 **(IAEA-TECDOC—362) Study of radioactive materials in the Baltic Sea. Report of the final research co-ordination meeting held in Helsinki, Finland 24-28 September 1984.** (International Atomic Energy Agency, Vienna (Austria)). Jan 1986. 189p. (CONF-8409349—). NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160.

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

This report presents an evaluation of the Coordinated Research Programme on the long-term behaviour of radionuclides entering in the Baltic Sea area, including their transport back to man, and some conclusions and recommendations together with the final reports given by the chief investigators on the activities performed during the entire coordinated research programme, from its inception in 1981 to its conclusion in 1984, as well as the results of Intercalibration Exercises. Separate abstracts were prepared for each of the 13 papers in this report.

48715 (INIS-mf—10171, pp 88-103) **Soil to plant transfer factors for Cs-137 and Pu-239+240 determined by field and glasshouse measurements in Great Britain.** Cawse, P.A.; Baker, S.J. (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). 1984. NTIS (US Sales Only), PC A09/MF A01. File Number DE86702996. (CONF-8404304—).

From IUR workgroup meeting on soil-to-plant transfer factors; Saint-Paul-lez-Durance, France (16 Apr 1984).

Further data on soil to plant transfer factors is provided for Cs-137 and Pu-239+240, as an extension of results presented at the previous IUR Workshop at Wageningen in December 1982. Field crops of grass, barley and oats produced in 1982 at 11 locations in Britain were analysed for radionuclides. Analysis of soils that produced these crops showed that they contained 'background' nuclear weapons fallout concentrations of Cs-137 and plutonium which were elevated in regions with high rainfall. Analysis of basic soil properties was also made. In separate experiments, transfer factors were derived for 10 crop plants grown in pot trials under glasshouse conditions. In one trial the soil used contained low concentrations of radionuclides derived from nuclear weapons fallout. In a second trial a brown earth was used, which contained additional radionuclides from long-term deposition by nuclear fuel reprocessing. 2 refs.; 1 figure; 5 tabs.

48716 (INIS-mf—10174, pp XVII/99) **Relation between tree ring records and short-term ^{3}H-contamination of precipitation.** Rank, D.; Rajner, V.; Staudner, F.; Kozak, F.; Biro, T.; Golder, F. (Bundesversuchs- und Forschungsanstalt Arsenal, Vienna, Austria; Institute of Isotopes, Budapest, Hungary). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48717 (INIS-mf—10174, pp XIII/82) **Radioactivity of frequently used building materials in Slovak Socialist Republic.** Wirdzek, S.; Kazimir, D. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48718 (INIS-mf—10174, pp XVI/97) **Technologically enhanced levels of natural radioactivity studied by gamma-ray spectrometry.** Braynik, D.; Kobal, I.; Korun, M.; Miklavzic, U. (J. Stefan Institute and Faculty of Electrotechnics E. Kardelj University, Ljubljana, Yugoslavia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48719 (INIS-mf—10174, pp XVIII/110) **Large-volume low-level Ge(Li) spectrometry of nuclear power plants environmental samples.** Slavik, O. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48720 (INIS-mf—10174, pp XVIII/104) **Fallout of low radioactivities ^{137}Cs, ^{90}Sr and ^{210}Pb on the mountains.** Semerdjieva, L.; Dimchev, T. (Bylgarska Akademiya na Naukite, Sofia. Inst. po Khidrologiya i Meteorologiya; Vissh Minno-Geolozhki Inst., Sofia, Bulgaria). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48721 (INIS-mf—10402, pp 29) **Biological monitoring of radionuclides released from nuclear facilities.** Jeffree, R.A. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48722 (KURRI-TR—248, pp 65-73) **On the data processing related to environmental radioactivity.** Nakamura, Isamu. (Japan Chemical Analysis Center, Chiba). May 1984. (In Japanese). NTIS (US Sales Only), PC A05/MF A01. File Number DE86780483. (CONF-8405416—).

From Meetings on nuclear science information and on-line retrieval; Kumatori, Osaka, Japan (10 May 1984).

The monitoring and measurement of environmental radioactivity have been undertaken by many organizations in Japan. The Japan Chemical Analysis Center has been entrusted by the government to gather and edit these measured results. The computer processing of these data started in 1978, and it is expected that by the end of fiscal year 1984, all fallout data since 1957 and all radioactivity monitoring data since 1969 can be registered. The computer programs for processing the data such as the output of tables and figures have also been developed, and the edition of reports has been made. The replacement of the computer and the development of a new processing system capable of handing Kanji (Japanese-Chinese characters) are now scheduled. This document outlines the data system such as the quality, quantity and origin of the measured data and the frequency of report publication. Some results of the analysis of fallout nuclides, space gamma dose rate and the total β-activity in rain are presented. The effects of the nuclear explosion tests in China are very obvious in these figures. A chronological table of the explosion tests in China is also presented. The different effects of time lag at the different places of measurement are also seen. The effects of the presence of nuclear power plants were also investigated at some sites of the plants, but no discernible effect was observed.

48723 (NIRS-RSD—69) **Radioactivity survey data in Japan.** (National Inst. of Radiological Sciences, Chiba (Japan); Japan Chemical Analysis Center, Chiba). Jun 1984. 31p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

Individual chapters are processed separately for the data bases.

48724 (NIRS-RSD—69, pp 8-10) **Strontium-90 and cesium-137 in rice (producing districts) from November 1983 to January 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in rice were determined using radiochemical analysis. Polished rice was collected in three producing districts at the harvest and in nine consuming areas when new crops were first put on sale. The sample was carbonized and ashed in a porcelain dish. The maximum value of Sr-90 was 0.40+-0.14 pCi/kg in rice collected from Yamaguchi in November 1983; the maximum value of Cs-137 was 0.3+-0.12 pCi/kg in rice collected from Yamaguchi in November 1983 and from Fukuoka in December 1983. (KN)

48725 (NIRS-RSD—69, pp 13-14) **Strontium-90 and cesium-137 in milk (producing districts for domestic program) from June 1983 to September 1983. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in milk from producing districts for domestic program were determined using radiochemical analysis. Raw milk was collected from six sampling locations. Milk in a stainless steel pan or a porcelain dish was evaporated to dryness followed by carbonization and ashing. The maximum values of Sr-90 and Cs-137 were 2.8 +- 0.30 pCi/l and 1.8 +- 0.23 pCi/l, respectively, in milk collected from Aomori in February 1984.

48726 (NIRS-RSD—69, pp 15-16) **Strontium-90 and cesium-137 in milk (consuming districts) from May 1983 to May 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in milk from consuming districts were determined using radiochemical analysis. Commercial milk was purchased from 26 sampling locations. Milk in a stainless steel pan or a porcelain dish was evaporated to dryness followed by carbonization and ashing. The maximum value of Sr-90 was 2.3 +- 0.30 pCi/l in milk purchased from Fukushima in May 1983; the maximum value of Cs-137 was 3.3 +- 0.25 pCi/l in milk purchased from Tottori in February 1984.

48727 (NIRS-RSD—69, pp 17) **Strontium-90 and cesium-137 in milk (powderd milk). Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in powdered milk were determined using radiochemical analysis. Six brands of commercial milk were purchased as samples in consuming districts in May 1984. Milk in a stainless steel pan or a porcelain dish was evaporated to dryness followed by carbonization and ashing. The maximum values of Sr-

90 and Cs-137 were 36.0 +- 1.3 pCi/kg and 190.) +- 2.0 pCi/kg, respectively, in milk manufactured by Meiji.

48728 (NIRS-RSD—69, pp 18-19) **Strontium-90 and cesium-137 in vegetables (producing districts) from November 1983 to March 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in vegetables from producing districts were determined using radiochemical analysis. Spinach, Japanese radish, cabbage, and Chinese cabbage were selected as the representatives for leaf vegetables and for non-starch roots, and were collected during the harvesting season from 12 sampling locations. After removing soil, the edible part of vegetable sample was dried and carbonized in a stainless steel pan or a porcelain dish. The maximum value of Sr-90 was 19.0 +- 0.80 pCi/kg in spinach collected from Kochi in January 1984; the maximum value of Cs-137 was 1.60 +- 0.26 pCi/kg in spinach collected from Kagoshima in November 1983.

48729 (NIRS-RSD—69, pp 20-21) **Strontium-90 and cesium-137 in vegetables (consuming districts) from November 1983 to February 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in vegetables from consuming districts were determined using radiochemical analysis. Spinach and Japanese radish were selected as the representatives for leaf vegetables and for non-starch roots, respectively, and were collected during the harvesting season from four sampling locations. After removing soil, the edible part of vegetable sample was dried and carbonized in a stainless steel pan or a porcelain dish. The maximum value of Sr-90 was 6.9 +- 0.36 pCi/kg in Japanese radish collected from Nagasaki in January 1984; the maximum value of Cs-137 was 0.50 +- 0.29 pCi/kg in spinach collected from Osaka in November 1983.

48730 (NIRS-RSD—69, pp 22-23) **Strontium-90 and cesium-137 in tea (Japanese tea). Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in Japanese tea were determined using radiochemical analysis. Five hundred grams of manufactured green tea was collected from six sampling locations in June 1984, carbonized and ashed in a stainless steel pan or a porcelain dish. The maximum value of Sr-90 was 88 +- 3.7 pCi/kg in tea collected from Kyoto; the maximum value of Cs-137 was 99.0 +- 3.60 pCi/kg collected from Kagoshima.

5105 Site Resource And Use Studies

48731 (CONF-841187—Vol.2, pp 747-751) **Los Alamos National Laboratory compliance with cultural resource management legislation.** Olinger, C.E.; Rea, K.H. (Los Alamos National Lab., NM). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Cultural resources management is one aspect of NEPA-induced legislation increasingly affecting federal land managers. A number of regulations, some of them recent, outline management criteria for protecting cultural resources on federal land. Nearly all construction projects at the 11,135 hectare Los Alamos National Laboratory in northern New Mexico are affected by cultural resource management requirements. A substantial prehistoric Pueblo an population occupied the Laboratory area from the 13th to the early 16th centuries. Grazing, timbering, and homesteading followed Indian occupation. Therefore, archaeological and historical ruins and artifacts are abundant. The Laboratory has developed a cultural resources management program which meets both legal and project planning requirements. The program operates in coordination with the New Mexico State Historical Preservation Office. Major elements of the Laboratory program are illustrated by a current project involving relocation of a homesteader's cabin located on land required for a major new facility. The Laboratory cultural resource management program couples routine oversight of all engineering design projects with onsite resource surveys and necessary mitigation prior to construction. The Laboratory has successfully protected major archeological and historical ruins, although some problems remain. The cultural resource program is intended to be adjustable to new needs. A cultural resource management plan will provide long-term management guidance.

48732 (ORNL/ESH—1/V19) **Resource management plan for the Oak Ridge Reservation. Volume 19. Synoptic inventory of groundwater wells and databases for the Oak Ridge Reservation.** Clapp, R.B.; Sherwood, C.B.; Dreier, R.B. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 69p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014416.

Personal communications with groundwater investigators and results from a well information questionnaire show that approximately 1400 wells divided into 5 main functional locations can be accounted for. The data do not include all the wells on the ORR, for even a casual inspection of waste sites shows deteriorated corrugated iron well casings that were probably abandoned years ago. Information on groundwater levels, flowpaths, and spatial and temporal trends in water quality on an ORR-wide basis is fragmented among diverse reports, studies, projects, and databases. There is no comprehensive picture of ORR groundwater quality or of the geological and geochemical factors that determine groundwater movement and quality. This report identifies three levels of databases: (1) well inventory systems containing basic parameters such as well coordinates using the administrative grid, local coordinates, data of construction, general purpose, common label (name), and alternative labels; (2) well information systems containing static parameters such as construction parameters, geophysical and core logs, elevation, and (perhaps) nominal water quality data; and (3) advanced, centralized database systems containing dynamic parameters such as water quality measurements and water levels and special-purpose software for statistical analysis and report generation.

5106 Regulations

REFER ALSO TO CITATION(S) 47777

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5201 Basic Studies

REFER ALSO TO CITATION(S) 47222, 47642, 48084, 48659, 48931, 48954

48733 (DOE/ER/60246—1) **Hydrology and geochemistry of small tundra drainage basins in response to active layer disturbance. Progress report.** Rundle, A.S. (Ohio State Univ. Research Foundation, Columbus (USA)). Jun 1986. Contract FG02-84ER60246. 15p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011485.

Hydrology of far northern drainage basins in which the shallow organic-rich surface layer overlies a permanently frozen substrate, is poorly known, yet is of great importance in evaluating natural stability and in predicting response to disturbances effecting flow and the distribution of nutrient and sedimentary ions. First-year study of a 2.5 km^2 watershed supports the primacy of the short duration melt-off in the yearly hydrologic/geochemical cycle. At this time basin storage capacity is minimum and total runoff carries with it a seasonal maximum of nutrient ions, suspended and dissolved solids. Subsequent to melt-off, base flow is high but decreases as thaw releases seasonally frozen water, including some temporarily stored melt-off. Spring storm events produce rapid peak discharges because of the low storage capacity in the catchment. Rare, high intensity, short duration storms in early season can produce discharges that rival diurnal peaks at melt-off. With activation of vegetation following melt-off, some nutrient ions are no longer detectable and pH becomes acid. Summer drought periods are common and if sufficiently protracted, reduce stream flow to

barely measurable quantities. At such times hydrographs may show small diurnal fluctuations in response to evapotranspiration cycles. Ion concentrations show an increase as senescence commences in mid-August.

48734 **(DOE/RL/01830—T46) 360 year temperature and precipitation record for the Pasco Basin derived from tree-ring data.** Cropper, J.P.; Fritts, H.C. (Arizona Univ., Tucson (USA). Lab. of Tree-Ring Research). Aug 1986. Contract AC06-76RL01830. 75p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014215.

Dendroclimatology, the study of past climatic variations by means of tree-ring analysis, is used to produce estimates of seasonal and annual temperature and precipitation from the 17th through 20th centuries. In this study these estimates, reconstructions, are derived in five different ways for regions that each include the Pasco Basin of south central Washington. The best of five sets of results were selected, based on the verification of the reconstructions with independent instrumental data. The reconstructed annual temperature of the Pasco Basin for the last three centuries was on the average 0.17 degrees Fahrenheit higher and had a standard deviation which was 4% larger than for the 20th century. The greatest reconstructed difference in the average temperature was in winter and the greatest reconstructed difference in the variance (standard deviation) was reconstructed in autumn. The average annual precipitation reconstructed for 1602 to 1900 was 0.32 inches higher than it has been in the 20th century. The change in average and standard deviation of reconstructed precipitation was greatest in autumn. Both the seasonal and annual reconstructions for temperature and precipitation exhibit large and persistent variations from the mean which are often most pronounced in the 17th century. Droughts were more common starting with the last half of the 17th century, with values that sometimes exceeded the 20th-century maximum amounts and duration. While there are some similarities among the four seasons and two variables, many differences between the seasonal reconstructions exist. 28 refs., 6 figs., 6 tabs.

48735 **(INIS-mf—9899) C-14 and Ar-39 content in a ground water aquifer in the Saarland - comparison of two ground water isotope dating methods.** Forster, M. (Muenchen Univ. (Germany, F.R.). Fakultaet fuer Physik). 14 Feb 1984. 141p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE86752573.

For the Ar-39 groundwater ages found an age comparison is made with ground waters investigated for C-14, Kr-85 and H-3 contents. The location of investigation is a sandstone aquifer of Southern Saarland. The underground production of Ar-39 the hydrological applicability. In granite, the average concentration of U, Th, K, and Cl with an average porosity of 1% and complete diffusion of the isotopes Ar-39 and Cl-36 produced underground can be as high as 10^5% for Ar-39 moderated and 16% Cl-36 moderated in the interstitial water.

48736 (INIS-mf—10174, pp VI/17) **Radiocarbon accelerator mass spectrometry for hydrological investigations.** Hut, G.; van der Borg, K. (International Atomic Energy Agency, Vienna, Austria. Section of Isotope Hydrology; Rijksuniversiteit Utrecht, Netherlands. Fysisch Lab.). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48737 **(TR-EL—82-4/82-11.42) Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida). Florida pompano.** Gilbert, C. (Florida State Museum, Gainesville (USA); Fish and Wildlife Service, Slidell, LA (USA). National Wetlands Research Center). Apr 1986. 23p. NTIS, PC A02/MF A01. File Number TI86901600.

Florida pompano is a marine species that is especially common along the Florida coast. Florida pompano is an excellent food fish, so it supports an important commercial and recreational fishery. Larvae live in the open sea, but juveniles use waters along beaches as nursery grounds. Juvenile pompano eat planktonic but mostly benthic invertebrates. Adults feed on invertebrates and fish. Pompano prefer temperatures of 28 to 32°C, and adults apparently prefer salinities of 28 to 37 ppt. Pompano died at dissolved oxygen concentrations of 2.5 ppM.

48738 **(TR-EL—82-4/82-11.48) Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Northwest). Coho salmon.** Laufle, J.C.; Pauley, G.B.; Shepard, M.F. (Washington Univ., Seattle (USA). Cooperative Fishery Research Unit; Fish and Wildlife Service, Slidell, LA (USA). National Wetlands Research Center). Apr 1986. 27p. NTIS, PC A03/MF A01. File Number TI86901607.

The coho is anadromous, swimming upstream from the ocean in fall to spawn. The fry hatch in the spring and outmigrate 1 to 2 years later. They usually spend two growing seasons at sea. They require clear, cold, well-oxygenated (<4 mg/l) stream water (1 m/sec) for spawning and rearing, with a gravel substrate, adequate cover, and a food supply of insects, crustaceans, and fishes for the young. All populations of coho salmon are limited by the amount of suitable rearing area available. They are sought after in both sport and commercial fisheries, and are very sensitive, especially the early life stages in streams, to such human-made impacts as siltation, pollution, removal of cover, and barriers to migration. Current management objectives of the State of Washington are toward MSH (maximum susstained harvest), with the treaty Indian tribes under the Boldt Decision (United States vs State of Washington) having a legal right to 50% of the catchable allocation.

48739 **(TR-EL—82-4/82-11.51) Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico). Black drum.** Sutter, F.C.; Waller, R.S.; McIlwain, T.D. (Gulf Coast Research Lab., Ocean Springs, MS (USA); Fish and Wildlife Service, Slidell, LA (USA). National Wetlands Research Center). Apr 1986. 20p. NTIS, PC A02/MF A01. File Number TI86901601.

Black drum are primarily an estuarine species. The time of black drum spawning depends on location. In Texas waters, heaviest spawning activity occurs during February and March near passes in open bays and estuaries, while in deeper Gulf waters they spawn from November to April. Larvae are transported into the estuarine environment where they grow to the juvenile stage, living in shallow, muddy waters, tolerating a wide range of environmental conditions. Black drum are commercially harvested by a variety of gears, with the majority of US landings taken in Gulf waters off Texas. They are also an important recreational species with more fish caught in the sport catch than harvested commercially. Young black drum feed on invertebrates and small fish, while adults consume mollusks and some decapods. Adults are found in salinities of 9 to 26 ppt and in water temperatures of 12 to 33°C. Juveniles are taken over muddy bottoms and adults are usually found over sand or soft bottoms and over oyster reefs or clam shell.

48740 **El Nin-tildeo: An approach towards equilibrium temperature in the tropical eastern Pacific.** Newell, R.E. (Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA 02139). **16**: No. 7, 1338-1342(Jul 1986).

A different view of El Nin-tildeo is proposed, namely, that it represents an approach towards the tropical equilibrium temperature of approximately 30° C, set essentially by evaporation, by the waters of the eastern tropical Pacific.

48741 **Automatic calibration of conceptual catchment models using derivative-based optimization algorithms.** Gupta, V.K.; Sorooshian, S. (Univ. of Arizona, Tucson). **21**: No. 4, 473-485(Apr 1985). Contract AC01-80RA50256.

This paper examines the possibility of using derivative-based optimization algorithms for automatic calibration of conceptual rainfall-runoff models with threshold structures. A method is discussed for explicit computation of the derivatives based on an analysis of the modality of behavior present in such models. In the method the threshold structures are not replaced by smoothing functions, thereby preserving the conceptual integrity of these models. The discussion includes a theoretical analysis of a single

linear reservoir (with threshold) model which provides some insights into the issue of threshold parameter identifiability. Simulation study comparisons of the Newton (derivative based) and the Simplex (direct search) optimization algorithms indicate that the former is more efficient, especially when the number of parameters to be optimized is large. However, the results indicate that careful study of the issues related to model identifiability is required if any significant progress is to be achieved in the area of automatic calibration of conceptual rainfall-runoff models.

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REFER ALSO TO CITATION(S) 47226, 48091, 48673, 48683, 48705, 48706, 48708, 48813, 48953

48742 (AD-A—168000/8/XAB) **Environmental and water-quality operational studies. Initial evaluation of a computer algorithm for simulating anaerobic conditions in reservoirs and lakes. Final report.** Zimmerman, Marc J. (Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Environmental Lab.). Feb 1986. 78p. NTIS, PC A05/MF A01.

A series of computer algorithms were developed to predict the concentrations of dissolved metals and nutrients in proposed and existing reservoirs. The algorithms, in the format of 13 subroutines, are incorporated in CE-QUAL-R1, the Corps of Engineers one-dimensional, numerical model of reservoir water quality. This evaluation documents procedures used early in the development and testing of the algorithms and has since led to modifications which have already improved CE-QUAL-R1 simulations in other applications. Field data derived from studies of DeGray Lake, Ark., provide the basis for calibrating and evaluating the algorithms. New model features specifically related to the simulation of anaerobic water-quality conditions include a simplified approach to initiate anaerobic processes, and simultaneous release from sediments of reduced materials and dissolved phosphorus. Oxidation and reduction processes in the water column are subject to the same constraints as those affecting sediment release. Two years of data from field studies, 1979 and 1980, were used to calibrate and evaluate simulations. In calibrating the model for assessing the new algorithms, sediment release rates were found to affect predictions most significantly. Although there were some discrepancies between observed and predicted conditions, trends and peak concentrations generally matched well. Further studies and applications of the model should help to assess its value as a tool in reservoir water quality management.

48743 (CONF-841187—Vol.1, pp 255-288) **Decommissioning of the CMP Pits.** Beckwith, R.G. (E.I. du Pont de Nemours and Co., Aiken, SC). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

In the period from 1971 to 1979, materials identified as hazardous by the Resource Conservation and Recovery Act (RCRA) of 1976 were buried in seven trenches at a Savannah River Plant (SRP) site identified as the Chemicals, Metals and Pesticides (CMP) Pits. Preliminary site investigations performed in 1982 and 1983 indicated that chlorinated organic chemicals buried in the pits had migrated downward through the underlying soil toward the groundwater table located approximately 75 feet below the bottom of the pits. Groundwater monitoring indicated that the water table beneath the pits was contaminated with up to 175 ppb total chlorinated organics. A decommissioning plan was developed for the CMP Pits and is being implemented to ultimately provide for the final closure of the site in accordance with state and federal regulations. Aspects of the plan include, (1) installation of 12 additional groundwater monitoring wells to assess site geologic and hydrogeologic characteristics, (2) excavation of waste materials from the CMP Pits, (3) geologic sampling and chemical analysis of soil core samples taken from beneath each of the 7 pits, (4) excavation of highly contaminated soil from beneath the pits as justified, (5) backfilling of the pits including installation of facilities beneath the site cap to allow for potential future soil contaminant vacuum recovery and/or soil flushing, (6) capping of the CMP Pits site with an 80 ml high density polyethylene (HDPE) liner, (7) continued groundwater monitoring, and (8) additional contaminant recovery via vacuum extraction and/or soil flushing if required to contain contaminants that are leaching into the groundwater.

48744 (CONF-841187—Vol.2, pp 437-463) **In-situ denitrification of ponds.** Napier, J.M. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC05-84OR21400.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

An in situ biological denitrification process successfully reduced nitrate ion concentrations in four 2.5 million gallon open-air holding ponds from nearly 40,000 mg/L to less than 50 mg/L. Concurrently, heavy metal concentrations were reduced to levels acceptable for discharge.

48745 (CONF-841187—Vol.2, pp 467-479) **Organics contamination of ground water - an open literature review.** Steelman, B.L.; Ecker, R.M. (Pacific Northwest Lab., Richland, WA). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC06-76RL01830.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Because of public pressure and federal and state regulatory activity, ground water contamination has recently received increased scientific investigation and engineering assessment. The disposal of hazardous wastes is one of the major sources of ground water contamination. A nationwide survey conducted for the US Environmental Protection Agency (EPA) indicated that organic compounds are the most common environmental contaminants, being found at 358 of the 395 hazardous waste sites included in the survey. A study by the Council on Environmental Quality (CEQ) showed that major ground water contamination problems, in many states, were caused by synthetic organic chemicals resulting from industrial and manufacturing operations. Past disposal practices, in some cases, have led and may lead to migration of organics from the disposal sites via the ground water pathway. DOE is currently implementing a program in response to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) of 1980. However, to date, non-DOE investigations of organics contamination of ground water have been more extensive and thorough than those at DOE facilities. Therefore, in anticipation of future DOE activities in this area, Pacific Northwest Laboratory has conducted an open literature review of organics contamination of ground water. The purpose of this review is to provide the DOE community with a brief summary of available field data on 1) the most commonly found organics of concern in ground water, 2) the behavior of organics in ground water (e.g., transport and transformation mechanisms), and 3) the extent of documented organics migration from the source of contamination.

48746 (CONF-841187—Vol.2, pp 481-501) **Development and implementation of a comprehensive ground water protection program at the Savannah River Plant.** Gordon, D.E. (Savannah River Lab., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026. Contract AC09-76SR00001.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A comprehensive program for protecting the quality of ground water underlying the Savannah River Plant has been developed and is being implemented. The major goals of the ground water protection program are to evaluate the impact on ground water quality as a result of Savannah River Plant operations, to take corrective measures as required to restore or protect ground water quality, and to ensure that future operations do not adversely affect the quality or availability of the ground water resources at the site. The specific elements of this program include 1) continuation of an extensive ground water monitoring program, 2) assessment of waste disposal sites for impacts on ground water quality, 3) implementation of mitigative actions, as required, to restore or protect ground water quality, 4) incorporation of ground water protection concepts in the design of new production and waste management facilities, and 5) review of site utilization of ground water resources to ensure compatibility with regional needs. The major

focal points of the ground water protection program are the assessment of waste disposal sites for impacts on ground water quality and the implementation of remedial action projects. Many locations at SRP have been used as waste disposal sites for a variety of liquid and solid wastes. Field investigations are ongoing to determine the nature and extent of any contamination in the sediments and ground water at these waste sites on a priority basis. Remedial action has been initiated, in one instance, for the removal and treatment of contaminated ground water in the vicinity of the fuel fabrication facilities.

48747 (CONF-841187—Vol.2, pp 505-528) **Ground water pollution control.** Steele, J.L. (E.I. du Pont de Nemours and Co., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Chlorinated organic compounds (trichloroethylene, tetrachloroethylene, and 1,1,1 Trichloroethane) were discovered in the ground water beneath the reactor and fuel target fabrication area at the Savannah River Plant in June 1981 during routine RCRA monitoring. A three phase program was implemented to systematically address the problem. Principal sources and contaminant location were identified. Air stripping was selected as the best suited remedial action technology. A pilot air stripping column with one recovery well was installed to evaluate air stripping and a 50 gpm production air stripper was installed with two recovery wells to expedite contaminant recovery. A 400 gpm air stripper has been designed and is being built. It will be an automated unit operating with eleven strategically located recovery wells and will be operational by March 1985. To date, the two air strippers have removed over 20,000 pounds of solvents and extensive geohydrological data continues to be collected. 138 monitor wells are sampled quarterly with 64 additional wells to be installed by December 1984. Current estimates indicate the plume contains 300,000-500,000 pounds of solvents. A three-dimensional, multi-layered finite-difference aquifer simulation model is being developed as a tool to assist with assessment of the program's effectiveness. Since June 1981, over $3,000,000 has been spent on the investigation and the full scale project will cost an additional $5,000,000. It is a very large, expensive, involved effort.

48748 (CONF-841187—Vol.2, pp 529) **Ground water monitoring and studies at Oak Ridge.** Cutshall, N.H.; Oakes, T.W.; Pritz, P.M.; Stone, J. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Ground water monitoring and related studies at Oak Ridge deal with activities ranging from highly applied tasks that support DOE environmental management programs on the Oak Ridge Reservation and at other sites to fundamental research in geohydrology. In addition to site-specific ground water programs at each of the three major plants in Oak Ridge, studies are carried out on the Reservation at large. The latter include multiplant cooperative projects as well as research and development in ground water, geology and hydrology. Ground water-related projects at Oak Ridge can be classified as characterization, monitoring, or basic ground water research. Ground water characterization studies are conducted to 1) determine suitability of sites for planned uses, 2) design monitoring systems, and 3) obtain parameters for modeling descriptions. Monitoring activities are designed to 1) satiafy regulatory requirements, 2) provide early warning of contamination problems, 3) signal need for remedial actions, and 4) establish effectiveness of site environmental programs including remedial measures. Basic research projects are underway that deal with 1) flow in homogeneous, anisotropic media including fractures and soil macropores, 2) geochemistry of solute transport in ground water, and 3) hydrologic and geochemical modeling. There is a significant exchange of information and sharing of field data among investigators for applied projects, such as monitoring and site characterization, and for basic research purposes. This exchange is mutually advantageous to all parties in its providing state-of-the-art technical support to site operations on the one hand and opportunities for practical applications of basic research efforts on the other.

48749 (CONF-841187—Vol.2, pp 531-540) **Investigation of ground water contamination potential at Sandia National Laboratories, Albuquerque, NM.** Thomson, B.M.; Smith, G. (Univ. of New Mexico, Albuquerque). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Sandia National Laboratories - Albuquerque has operated a small chemical waste landfill disposal facility for over 20 years. The facility consists of unlined pits for disposal of segregated lab wastes and a lined pit for disposal of waste chromic acid, although prior to 1978 this was dumped in an unlined pit. Field investigations have found evidence of chromium migration to a depth of about 15 m below the unlined pit, at a concentration of about 10 $\mu g/g$. Other contaminants have not been found in the soil column. The chromium appears to be in an oxidized, and therefore mobil state, however unsaturated ground water velocities at the site are very small. A monitoring program is described to insure protection of ground water resources at the site.

48750 (CONF-841187—Vol.2, pp 717-721) **NPDES program at the Savannah River Plant.** Lewis, M.W. (E.I. du Pont de Nemours and Co., Aiken, SC). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

On January 1, 1984 the Department of Energy - Savannah River was issued a renewal NPDES permit listing 63 specific industrial and sanitary waste water effluent discharge points. This NPDES permit is the largest issued by SCDHEC for a single plant site. It took two calendar years of work by SCDHEC to review the permit renewal application and to finalize the various draft permits. The permit specifies monitoring at each of the 63 "outfalls" to determine status of compliance with permit conditions. Additionally, SCDHEC has placed requirements on SRP to develop a Best Management Practices Plan for hazardous substances as prescribed by draft EPA regulations. SRP also has to determine the amount of pollutant discharge in storm sewer systems. Implementation of the extensive monitoring program initially identified numerous instances of noncompliance. In the first quarter there were 26 exceptions to the permit limits. Major efforts were made to identify causes and develop corrective action. There were only six exceptions directly related to process operations. The largest single cause of noncompliance was stormwater runoff during rains which resulted in total suspended solids carryover into the sewer systems. Corrective action which has included permit revision has reduced the number of exceptions to seven in the second and seven in the third quarters. The NPDES program also includes assessment of the thermal effects of reactor cooling water effluent on the environment. Special studies of Par Pond and the planned L-Reactor Lake are requirements of the NPDES process.

48751 (PB—86-190972/XAB) **Sulfide precipitation of nickel and other heavy metals from single- and multi-metal systems. Final report.** Bhattacharyya, D.; Chen, L.F. (Kentucky Univ., Lexington (USA). Dept. of Chemical Engineering). Apr 1986. 111p. NTIS, PC A06/MF A01.

Precipitation behavior of heavy metals (Ni, Co, Cd, Cu, and Zn) was studied extensively in single- and multi-metal systems. Kinetic studies showed that NiS oxidation (as a function of pH, oxygen, and reaction time) caused the dissolution of NiS. CoS precipitation would require high pH, short detention times, or closed reactors (under N_2 atmosphere). In the multi-metal systems without nickel, CdS, and ZnS precipitation were the same as in their single-metal systems; however, the precipitations were affected in nickel, CdS and ZnS precipitation were the same as in their single-metal systems; however, the precipitations were affected in nickel-containing systems because of NiS oxidation. Results of CdS precipitation from multi-metal systems (with or without nickel) were substantially better than the single-metal case.

48752 (PB—86-201340/XAB) Inventory of non-federally funded marine pollution research, development and monitoring activities: Northeast and Mid-Atlantic Region. Caton, G.M.; Opresko, D.M.; Weaver, R.S. (Oak Ridge National Lab., TN (USA)). Dec 1985. 244p. NTIS, PC A11/MF A01.

The Northeast and Mid-Atlantic inventory includes marine-pollution projects conducted in or are related to the states of Virginia, Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine. Projects related to outer continental shelf, oceanic, coastal, and estuarine areas are included. Some projects related to freshwater areas are also included where these were conducted for the purpose of determining sources of pollutants in estuarine and coastal areas or the effects on the marine environment resulting from changes in freshwater areas.

48753 (PB—86-206034/XAB) Nashua Impoundment sediment sampling, June 1985. Carleton, J.E. (Iowa Dept. of Water, Air and Waste Management, Des Moines (USA)). Oct 1985. 59p. NTIS, PC A04/MF A01.

The Iowa Department of Water, Air and Waste Management sampled the sediment of the Nashua Impoundment on the Cedar River in Chickasaw County during June, 1985. The sediment samples were analyzed using the Extraction Procedure (EP) Toxicity Test for eight heavy metals and six pesticides. The samples were also tested for total concentrations of cyanides, phenols, fluorides, chlorides, and eleven heavy metals. The sampling was done to determine if the sediment has been contaminated by chemicals that may have seeped out of the LaBounty hazardous waste site in Charles City, about ten miles upstream.

48754 (PB—86-207495/XAB) Estimated average annual alkalinity of six streams entering Deep Creek Lake, Garrett County, Maryland. Final report, May 1983-June 1984. Hodges, A.L. (Geological Survey, Dover, DE (USA). Water Resources Div.). Apr 1986. 73p. NTIS, PC A04/MF A01.

The study was done during 1983 to determine the sources of alkalinity to Deep Creek Lake, Maryland, and to make a rough estimate of the amount of alkalinity that enters the lake from six streams that drain carbonate and noncarbonate bedrock formations. Bedrock in the basin is predominantly sandstone and shale. Four streams draining the Greenbrier and two streams draining noncarbonate formations were sampled to assess the contribution of alkalinity to Deep Creek Lake. Average annual alkalinity of sampled streams ranged from 7.6 to 36.8 tons per year per square mile of drainage area. The average total alkalinity contributed to Deep Creek Lake by these streams is 161 tons per year as calcium carbonate. Inflow to streams from adjacent or underlying carbonate bedrock was apparent in several streams from increased values of pH and conductance.

48755 (PB—86-208709/XAB) USEPA (United States Environmental Protection Agency) method study 7. Analyses for trace elements in water by atomic absorption spectroscopy (direct aspiration) and colorimetry. Final report. Winter, J.A.; Britton, P.W. (Environmental Protection Agency, Cincinnati, OH (USA). Environmental Monitoring and Support Lab.). Jun 1986. 250p. (EPA/600/4—86/025). NTIS, PC A11/MF A01.

The report describes a study of ten elements: aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, selenium and zinc, at trace levels in water. Six sample concentrates, each containing the ten trace elements, were sealed in glass ampuls, verified as homogeneous and stable over time, and provided to the analysts with instructions for sample preparation and analyses. Mean recovery, overall standard deviation, and single-analyst standard deviations were calculated for each element at each concentration and for the two water types.

48756 Vapor-aerosol physicochemical laboratory. Lore, J.D.; Skeen, L.M. (Oak Ridge Gaseous Diffusion Plant, TN). pp 9-16 of Analytical chemistry instrumentation. Laing, W.R. (ed.). Chelsea, MI; Lewis Publishers, Inc. (1986). (CONF-8510151—).

From 28. Oak Ridge National Laboratory conference on analytical chemistry; Knoxville, TN, USA (1 Oct 1985).

A laboratory capable of generating and characterizing vapors and aerosols at typical ambient concentration levels observed in chemical processing operations has been established at the ORGD Plant, operated by Martin Marietta Energy Systems, Inc. for the USDOE. A three-stage generation system (TSGS), originally developed by SRI, International, for the analytical methods validation studies sponsored by NIOSH, has been installed. Several aerosol/particulate monitors, controlled by microcomputers, provide the means for semi-real-time particle size and mass concentration measurements over the size range 0.1-10 μm. A full complement of chemical analysis instrumentation including laser Raman spectroscopy and gas chromatography-mass spectrometry is available for in-situ or sequential measurements of TSGS diluents.

48757 Fate of particles and particle-reactive trace metals in coastal waters: radioisotope studies in microcosms. Santschi, P.H.; Adler, D.M.; Amdurer, M. (Columbia Univ., Palisades, NY). pp 331-349 of Trace metals in sea water. Wong; Doyle; Bruland; Burton; Goldberg (eds.). New York, NY; Plenum Publishing Corporation (1983).

Many trace metals rapidly adsorb to suspended particles when introduced to the water column of coastal marine environments. The transport of these particles and particle-reactive trace metals from the water column to the sediments was studied using radiotracer techniques in large microcosm tanks simulating Narragansett Bay. Transfer rates of radioactive trace metals and plastic particles (tracer microspheres) to the sediments were much greater in mid-summer than in mid-winter. This coincided with an order-of-magnitude higher particle flux through the water column due to higher sediment-resuspension rates in the summer. Laboratory experiments using settling cylinders showed that interaction between the water column and bottom sediments greatly accelerates the deposition velocities of particles. Experiments using a zooplankton cage and sediment traps in the microcosm tanks indicated further that, in shallow marine environments, zooplankton filter feeding is a much-less-important transfer process than filter feeding by benthic organisms - which may greatly increase the removal rates of particles and particle-reactive trace metals from the water column during the summer. 39 references, 3 figures, 6 tables.

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REFER ALSO TO CITATION(S) 47316, 47325, 47330, 47331, 47332, 47335, 47337, 47338, 48074, 48576, 48678, 48684, 48699, 48700, 48701, 48711, 48718, 48721, 48723

48758 (BfG—0142) Radionuclides in sediments - a comparative analysis 1983. Mundschenk, H. (Bundesanstalt fuer Gewaesserkunde, Koblenz (Germany, F.R.)). Jan 1984. 95p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752593.

On behalf of the BMI (Federal German Ministry of the Interior) the BfG in 1983 started another interlaboratory comparison (among 39 measuring points) on the topic of radionuclides in sediments, in order to test the reliability of Gα, Gβ/Rβ measurements and individual nuclide measurements in sedimentary samples under practical conditions. The study again proved its usefulness in as much as some inadequacies were revealed, and error sources could be eliminated.

48759 (CEA-R—5319) Behaviour of cesium 137, chromium 51, cobalt 60, manganese 54, sodium 22 and zinc 65 in simulated estuarine environments. Effects of suspended mineral particles and dissolved organic matters. Mahler, P. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France); Nice Univ., 06 (France)). Sep 1985. 190p. (In French). NTIS (US Sales Only), PC A09/MF A01. File Number DE86750860.

This laboratory investigation studied the retention of 6 radionuclides (cesium 137, chrome 51, cobalt 60, manganese 54, sodium 22 and zinc 65) on three types of clay particles (kaolinite, illite, montmorillonite) and on sediments, suspended in media with salinities ranging between 0 and 34 per mill, with or without organ-

ic matters. Measurement of the radioactivity retained by the particles after 5 days' contact with the radionuclide made it possible to calculate the percentages retained and the distribution coefficients, and to follow their evolution versus salinity. Parallel experiments studied the behaviours of the 6 radionuclides as a function of experimental factors (wall effect, contact time..). An exhaustive bibliographic review gives the state-of-the-art of the knowledge. The following conclusions were derived: - the retention of all the radionuclides but chromium 51 decreased as soon as a low salinity appeared. Chromium (available as Cr^{3+}) precipitated quickly and strongly during fixation whatever the surfaces or the conditions: - as for the role of the clay type, illite showed a strong affinity for cesium 137; manganese 54 had a particular behaviour with montmorillonite that enhanced its precipitation into MnO_2; with cobalt, sodium and zinc, the percentages retained were always <= 20% and the type of clay had little effect; - dissolved organic matters had little effect on the behaviour of cesium or chromium; for sodium and zinc, strong complexation occurred with the organic matter which was retained on the particles; cobalt and manganese gave intermediate results; - attempts to modeling emphasized the specific feature of the various reactions (adsorption by exchange with some compensating cations, absorption in the crystal lattice, surface retention of particular compounds).

48760 (CONF-841187—Vol.2, pp 555-569) **Statistical/ modeling approach to ground water monitoring at Brookhaven National Laboratory.** Hauptmann, M.G.; Meinhold, A.F.; Oden, N.; Kaplan, E.; Naidu, J.R. (Brookhaven National Lab., Upton, NY). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A new approach is described which uses a statistical technique (kriging) in combination with a solute transport model to provide guidance to ground water monitoring activities at the Brookhaven National Laboratory site. Kriging was used to generate a continuous water level surface using synoptic June 1983 water level data. The water level surface in the landfill/waste management area has implications for the interpretation of ground water monitoring data. The Prickett/Lonnquist Random Walk Model was used to simulate the movement of tritium from the landfill over a ten year period. The simulation accounted for decay and for the periodic addition of tritium to the landfill. The source term was based on records documenting the amount of tritiated mouse litter added to the landfill from 1972 to 1976. The kriged water level surface was used as input to the model, and the flow field used in model calculations was based on this data. Tritium levels based on monitoring data from 1983 were kriged and this surface compared to model predictions. The model concentration prediction closely matches the monitoring data, and the pattern apparent in the two surfaces is similar. Prior to this work a southeasterly direction of ground water flow had been assumed in this area. The kriged water level surface and the model prediction both indicate that the movement of ground water is more complex.

48761 (IAEA-TECDOC—362, pp 176-186) **Report of intercalibration exercises organized for the laboratories participating in the IAEA's co-ordinated research programme "Study of Radioactive Materials in the Baltic Sea" in 1981-1984.** Bojanowski, R.; Fukai, R.; Ballestra, S.; Vas, D. (International Atomic Energy Agency, Monaco-Ville, Monaco. Lab. of Marine Radioactivity). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

The objectives of the intercalibration exercises were to offer the laboratories a possibility of cross-checking their analytical results, to discover and eliminate possible systematic errors and to give the data a common base in order to ensure their overall comparability. The concentrations of the radionuclides ^{40}K, ^{54}Mn, ^{60}Co, ^{65}Zn, ^{90}Sr, ^{134}Cs, ^{137}Cs, ^{238}Pu, ^{239}Pu, ^{240}Pu and ^{241}Am were measured in the seawater samples SW-N-2 and SW-B-1, the sediment sample SD-N-1/1 and the seaweed Fucus vesiculosus sample AG-B-1. 6 refs, 9 tabs.

48762 (IAEA-TECDOC—362, pp 32-51) **Transfer of radiocesium and ^{90}Sr from Sellafield to the Danish Straits.** Aarkrog, A.; Dahlgaard, H.; Boelskifte, S. (Risoe National Lab., Roskilde, Denmark). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

A main purpose of the Danish participation in the coordinated research programme on radionuclides in the Baltic Sea has been the study of inflow and outflow through the Danish Straits. Applying the effluents of radiocesium and ^{90}Sr from the reprocessing plant: Sellafield in the UK, it has been possible to calculate transfer factors for these radioelements to surface as well as to bottom water in the Danish Straits. It has furthermore been possible to estimate the transfer time from a waterborn pollutant in the Irish Sea to the Danish Straits and to calculate the dilution factor. The inflow of radioactivity from Sellafield through the Danish Straits to the Baltic Sea is somewhat less than 1% of the discharges. 10 refs, 5 figs, 5 tabs.

48763 (IAEA-TECDOC—362, pp 53-62) **Inventories of certain long-lived radionuclides in the Baltic Sea.** Salo, A.; Tuomainen, K.; Voipio, A. (Finnish Centre for Radiation and Nuclear Safety, Helsinki; Institute of Marine Research, Helsinki, Finland). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

During several years monitoring programmes have been carried out by Finnish scientists in the Baltic Sea, especially in the Gulf of Finland and the Gulf of Bothnia. The inventories of ^{137}Cs, ^{90}Sr, ^{239}Pu and ^{240}Pu in sea water and sediments of the Baltic Sea are presented. 28 refs, 5 figs, 5 tabs.

48764 (IAEA-TECDOC—362, pp 89-109) **Results of the radiological Baltic-monitoring programme of the GDR during 1975-1983.** Weiss, D.; Moldenhawer, F. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin, German Democratic Republic). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

During 1975 - 1983 complex field studies on the content and distribution of the artificial radionuclides H-3, Sr-90 and Cs-137 of the open Baltic Sea and of some GDR coastal waters were carried out. Samples of different compartments of the marine environment were taken. To estimate the radionuclide balance in the Baltic Sea measurements on river water and on transition areas between the Baltic Sea and the North Sea were included. The distribution pattern of Sr-90 and H-3 in Baltic Sea water reflect the fallout burden distribution in the components of the water balance. In contrast, the Cs-137 distribution pattern are highly influenced by liquid effluences from nuclear reprocessing plants of western Europe. The mean values and concentration ranges for Sr-90 and Cs-137 in biota and sediments confirm other published results. The dose calculations via ingestion of Baltic fish demonstrate that no radiological consequences have recently occurred. 20 refs, 12 figs, 18 tabs.

48765 (IAEA-TECDOC—362, pp 110-132) **Radiological investigations in the Baltic Sea, including the Danish Straits and the Kattegat during 1982 and 1983.** Kautsky, H.; Wedekind, C.; Eicke, H.F. (Deutsches Hydrographisches Inst., DHI, Hamburg, Germany, F.R.). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

In connection with earlier investigations during the years 1975 to 1981, during 1982 in the region of the western Baltic Sea

including the Danish Straits and 1983 in the whole of the Baltic Sea region as well as in the Danish Straits and the Kattegat, water samples were taken from different depths for the investigation of their content of different radionuclides. In all the samples, the salinity and the activity concentrations of Cs-137 and Sr-90 were determined. In 1983, in addition, in 41 samples from 27 stations the content of Tritium was measured and in 32 samples from 16 stations the content of transuranic nuclides. Altogether, the picture of the activity distribution of artificial radionuclides, compared with 1981, has hardly changed in the Baltic Sea. In the western Baltic Sea and the Baltic Proper there exists a clearly recognizable relation between the salinity and the Cs-137 concentration; high salinities are linked with high Cs-137 activity concentrations. In the case of Tritium, this relationship is practically the reverse; that means, the lower the salinity - then the higher the Tritium concentration. The content of Sr-90 is relatively independent of the salinity content. It may, almost exclusively originate from the worldwide fallout. Of transuranic nuclides, practically only Pu-239+240 is detectable, from which, as a result of the relatively slight number of measurement values, so that, in total, this permits no clear distribution pattern to be recognized. In total, the activity concentrations of Tritium and Cs-137, especially in surface water, show a clearly reducing tendency when compared with the previous years. In the few bottom samples investigated from the western Baltic Sea, only Cs-137 could be detected by means of gamma spectrometry. Its activity concentrations showed strongly varying values dependent upon the type of the sediment. 10 refs, 17 figs, 2 tabs.

48766 (IAEA-TECDOC—362, pp 141-151) **Monitoring of the radioactive materials in the Baltic Sea.** Jaworowski, Z.; Baranski, A.; Grzybowska, D.; Pawlak, A.; Pietruszewski, A.; Suplinska, M.; Wardaszko, T.; Tomczak, J.; Skiba, D. (Centralne Lab. Ochrony Radiologicznej, Warsaw, Poland; Marine Dept., Inst. of Meteorology and Water Management, Gdynia, Poland). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

Between 1975 and 1984 the measurements of concentrations of Sr-90, Cs-137, Pu-239, 240, H-3, K-40, Ra-226, Th-232, Ti, Mn, Fe, Zn, Rb, Pb, Cd and Sr have been determined in various components of the Baltic Sea. The radionuclides were determined by radiochemical and gamma spectroscopic methods, and the stable nuclides by differential pulse anodic stripping voltametry and by energy dispersive X-ray fluorescence. The concentrations of Cs-137 in the Baltic seawater was up to 7 times lower than in the Northern sea but 20 times higher than in the water from the Polish rivers. The concentrations of Cs-137 were related to the salinity. In sediments Sr-90 levels were 1-2 orders of magnitude lower than those of other nuclides. The radioactivity of fish was found 1 order of magnitude higher in the Baltic than in Polish lakes and rivers. 1 fig, 12 tabs.

48767 (IAEA-TECDOC—362, pp 69-78) **Accumulation of certain long-lived radionuclides by littoral algae and bottom animals.** Tuomainen, K.; Ilus, E.; Taipale, T.K. (Finnish Centre for Radiation and Nuclear Safety, Helsinki). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

The ^{90}Sr, ^{137}Cs, sup(239,240)Pu and ^{241}Am contents in the seaweed Fucus vesiculosus ranged from 15 to 26, from 5.6 to 11, from 0.10 to 0.30 and from 0.011 to 0.070 Bq kg^{-1} dry weight, respectively. The mean concentration factor on dry weight basis was 840 for ^{90}Sr, 670 for ^{137}Cs, 39,000 for sup(239,240)Pu and 19,000 for ^{241}Am. In the mussel Macoma baltica samples of the activity concentrations of ^{90}Sr, ^{137}Cs, sup(239,240)Pu and ^{241}Am varied from 9.5 to 18, from <0.2 to 1.9, from 0.016 to 0.097 and from 0.007 to 0.029 Bq kg^{-1} fresh weight, respectively. The mean CF value on fresh weight basis was 650 for ^{90}Sr, 48 for ^{137}Cs, 5800 for sup(239,240)Pu and 2000 for ^{241}Am. In the intact mussel Mytilus edulis samples of the ^{90}Sr contents varied from 5.1 to 6.1, sup(239,240)Pu contents from 0.0034 to 0.012 and ^{241}Am contents from 0.0026 to 0.0056 Bq kg^{-1} fresh weight. ^{137}Cs concentrations were usually below detection limit, 0.13 Bq kg^{-1} fresh weight. The mean contents of ^{90}Sr, ^{137}Cs and sup(239,240)Pu in shells were 22, <0.13 and 0.033 Bq kg^{-1} fresh weight, respectively. The mean CF values on fresh weight basis for ^{90}Sr, ^{137}Cs, sup(239,240)Pu and ^{241}Am for the intact mussel were 240, <9.1, 1300 and 4300, respectively. 10 refs, 1 fig, 5 tabs.

48768 (IAEA-TECDOC—362, pp 152-161) **Releases distribution and pathways for radionuclides in the Baltic Sea.** Holm, E.; Duniec, S.; Hallstadius, L.; Rioseco, J.; Samuelsson, C.; Mattsson, S. (International Atomic Energy Agency, Monaco-Ville, Monaco. Lab. of Marine Radioactivity; Lund Univ., Sweden. Dept. of Radiation Physics; Goeteborg Univ., Sweden. Dept. of Radiation Physics). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

Fission, activations products and transuranic elements concentrations were measured in water, sediment and biota in the Baltic Sea. The results of long term and seasonal variations for ^{137}Cs, ^{99}Tc, $^{239+240}Pu$ and ^{241}Am are presented and discussed. 8 refs, 13 figs, 1 tab.

48769 (IAEA-TECDOC—362, pp 79-84) **Local patterns of the distribution of radionuclide releases from the Loviisa nuclear power station.** Ojala, J.; Ilus, E.; Sjoeblom, K.L. (Finnish Centre for Radiation and Nuclear Safety, Helsinki). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

The annual liquid discharges of radionuclides ^{58}Co, ^{60}Co and sup (110m)Ag from the Loviisa power station in 1981-1983 were about 10^9 Bqa^{-1}. The monthly concentrations of activation products in the seaweed Fucus vesiculosus varied between 0.5-120 Bq kg^{-1} for ^{58}Co, 0.5-170 Bq kg^{-1} for ^{60}Co and 0.5-130 Bq kg^{-1} for sup (110m)Ag on dry weight basis. The shape of the theoretical and experimental curves are in reasonable agreement with the time variation of releases. 7 refs., 4 figs., 2 tabs.

48770 (IAEA-TECDOC—362, pp 162-175) **Investigation of the radioactive contamination of the Baltic Sea in 1980-1983.** Lazarev, L.N.; Kuznetsov, Yu.V.; Gedeonov, L.I. (Radievyj Inst., Leningrad, USSR). Jan 1986. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703160. (CONF-8409349—).

From Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea; Helsinki, Finland (24 Sep 1984).

The content of radionuclides in the water of the Baltic Sea has been studied in the USSR since 1970. During the period of 1980-1983 the investigations of artificial radionuclides contents and distribution were carried out in different parts of the Baltic Sea. The objects of investigations were water, fish, bottom sediments and seaweeds. The results obtained are presented in the paper. 25 refs, 8 figs, 9 tabs.

48771 (INIS-mf—10174, pp XII/62) **Low radioactivity investigations of tritium in natural waters.** Kostadinov, K. (Sofia Univ., Bulgaria). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48772 (INIS-mf—10174, pp XVI/96) **^{222}Rn and ^{226}Ra in fresh waters: measurement method and results.** Wardaszko, T.; Grzybowska, D. (Centralne Lab. Ochrony Radiologicznej, Warsaw, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48773 (INIS-mf—10174, pp vp) **Simultaneous measurement of tritium activity and the background count rate in a proportional counter by Povinec method; three year experience at Ruder Boskovic Institute.** Krajcar-Bronic, I.; Obelic, B.; Srdoc, D. (Institut Rudjer Boskovic, Zagreb, Yugoslavia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48774 (INIS-mf—10174, pp vp) **Response of hydrological systems to the variations of the ^{14}C activity of the atmosphere.** Srdoc, D. (Institut Rudjer Boskovic, Zagreb, Yugoslavia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48775 (INIS-mf—10174, pp XIII/76) **^{222}Rn determination from total alpha-activity time relationship.** Hanslik, E.; Mansfeld, A. (Water Research Institute, Prague, Czechoslovakia). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48776 (INIS-mf—10402, pp 19) **Radium accumulation in the water-lily, nymphaea, from the Magela Creek, N.T. .** Twining, J.R. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48777 (INIS-mf—10402, pp 38) **Bioaccumulation of radionuclides in flora and fauna of the Alligator Rivers region.** Johnston, A. (Office of the Supervising Scientist for the Alligator Rivers Region, Sydney, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48778 (NIRS-RSD—69, pp 26-27) **Strontium-90 and cesium-137 in shellfish from February 1984 to July 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in shellfish were determined using radiochemical analysis. Approximately 4 kg of shellfish (Saxidomuspurpuratus, Ostrea gigas, Gomphina melanaegis, and Turbo cornutus) including the shells was collected or purchased during the fishing season from four sampling locations. After removing the shells, each sample was carbonized, and was then ashed in an electric muffle furnace. The maximum values of Sr-90 and Cs-137 were 0.5+-0.47 pCi/kg and 1.2+-0.34 pCi/kg, respectively, found in oyster collected from Hiroshima in February 1984.

48779 (NIRS-RSD—69, pp 28-29) **Strontium-90 and cesium-137 in seaweeds from February 1984 to June 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in seaweeds (Undaria pinnatifida) were determined using radiochemical analysis. Two to three kg of edible seaweed was collected during the fishing season from six sampling locations, and rinsed with water to remove sand and other adhering matters on the surface. These were removed of excess water, weighed, dried and ashed. The maximum values of Sr-90 and Cs-137 were 1.4+-0.28 pCi/kg from Ishikawa in April 1984 and 1.6+-0.23 pCi/kg from Niigata in May 1984, respectively. (KN)

48780 (NIRS-RSD—69, pp 5-7) **Strontium-90 and cesium-137 in total diet from October 1983 to July 1984. Environmental and dietary materials.** Jun 1984. NTIS (US Sales Only), PC A03/MF A01. File Number DE86780482.

In Radioactivity survey data in Japan.

Sr-90 and Cs-137 in total diet were determined using radiochemical analysis. A full one day ordinary diet including three meales, water, tea, and other in-between snacks for five persons was collected as a sample of "total diet" from 29 sampling locations. The sample in a large stainless steel pan was carbonized carefully by direct application of gas flame, and was transfered to a porcelain dish and then ashed at 500°C in an electric muffle furnace. The maximum values of Sr-90 and Cs-137 were 5.8+-0.47 $pCi.p^{-1}.d^{-1}$ and 19.0+-0.60 $pCi.p^{-1}.d^{-1}$ in total diet collected from Akita in July 1984. (KN)

5205 Site Resource And Use Studies

48781 (DOE/BP/34796—1) **Feeding activity, rate of consumption, daily ration and prey selection of major predators in John Day Reservoir. Annual report.** Gray, G.A.; Palmer, D.E.; Hilton, B.L.; Connolly, P.J.; Hansel, H.C.; Beyer, J.M.; Lofy, P.T.; Duke, S.D.; Parsley, M.J.; Mesa, M.G. (Fish and Wildlife Service, Cook, WA (USA). Willard Field Station). Jul 1986. Contract AI79-82BP34796. 178p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE86014192.

The extent of predation on juvenile salmonids in John Day Reservoir was determined. Salmonids were the single most important food item by weight for northern squawfish (Ptychocheilus oregonensis) in the restricted zones at McNary tailrace and John Day forebay during all sampling periods. Salmonids accounted for 18.1% of the weight in the diet of walleyes (Stizostedion vitreum vitreum) in 1984 which was at least twice that found in previous years. In smallmouth bass (Micropterus dolomieui) salmonids contributed little to their diet whereas for channel catfish (Ictalurus punctatus) fish accounted for 64.1% of the weight in their diet with salmonids responsible for approximately half of this weight. An intensive search of the fisheries literature was conducted to review various fish capture and control techniques which might have potential as predation control measures for the major predators of juvenile salmonids in the Columbia River system. Most prey protection measures were judged to have high potential and direct predator control measures were judged to have moderate or low potential.

5206 Regulations

REFER ALSO TO CITATION(S) 47195, 47777, 48228, 48702, 48703

48782 (CONF-841187—Vol.2, pp 502-503) **SRP comprehensive ground water protection program. The Savannah River Operations Office's management approach.** Wright, S.R. Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A brief description will be given of the Savannah River Operations Office's approach to establishing and implementing a comprehensive ground water protection program for the Savannah River Plant.

53 ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

5301 Social And Economic Studies

48783 (IIUG/dp—84-1) **Preventive environmental policy: Ecological modernisation and structural policy.** Jaenicke, M. (Wissenschaftszentrum Berlin (Germany, F.R.). Internationales Inst. fuer Umwelt und Gesellschaft; Freie Univ. Berlin (Germany, F.R.). Fachbereich Politische Wissenschaft). 1984. 46p. (In German). NTIS as TIB/B86-08608.

In most industrialized countries, the function of environmental policy is still limited to the repairing of existing environmental damage and the combatting of symptoms. Even the elan that environmental policy is currently experiencing is usually directed at the substitution of earlier forms of pollution control ('policy of high stacks') with modernized forms ('additive technologies'). Shortcomings of this pollution control strategy can to some extent be overcome through 'integrated technologies' and by ecologically modernizing the existing economic structures. However, in the course of long-term growth processes, these effects will become neutralized by the increase of 'residual problems'. This will necessitate an extensive structural change. This paper shows that the structural changes, in the form of a change in the raw materials base and a growing 'tertiary development', is already widely taking place. The condition that causes this change is not, however, preventive environmental policy, but the trend in prices for non-renewable resources. Strategies of a 'New Interventionism' could be called upon to support such development.

5302 Assessment Of Energy Technologies

REFER ALSO TO CITATION(S) 47326, 48747

48784 (CONF-841187—Vol.1, pp 23-31) **Environmental risk assessment.** Rowe, W.D. (The American Univ., Washington, DC). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

An overview is presented of risk assessment as related to environmental and health related problems. Risk assessment is not a substitute for effective planning and decision making, but it can be helpful in focusing on the critical issues and parameters, thereby making implicit value judgments visible. Emphasis is placed on the acceptable levels of risk and how they are controlled.

48785 (CONF-841187—Vol.1, pp 77-85) **EPA perspective on environmental auditing.** Fleckenstein, L.J. (Environmental Protection Agency, Washington, DC). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Environmental auditing, as an evaluation of facility operations and practices, is first and foremost a check on environmental compliance systems. Audits should supplement, and not replace, environmental compliance activities at the facility level. Audits serve to assess compliance status, environmental management effectiveness, and various risks. EPA has been endorsing auditing because a decision to audit implies a necessary commitment to correct problems discovered through an audit. EPA has been developing information on auditing practices and issues, serving a clearinghouse role to promote effective auditing. The authors also have begun to assist Federal agencies, primarily in the Department of Defense, to develop audit systems. Recently EPA has started to evaluate Agency policies which influence and could encourage auditing. For example, they feel that EPA owes the regulated community clarification of their intent regarding access to audit reports and audit-generated information. They may also develop auditing guidance, especially for use by Federal agencies. If so, they will be seeking advice from experienced environmental auditors on appropriate auditing principles and practices. 11 references.

48786 (CONF-841187—Vol.1, pp 89-100) **Allied Corporation surveillance program.** Rhodes, R.L. Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Environmental auditing has been demonstrated by many companies over the past few years to be a very important adjunct to environmental management programs. Numerous successful applications of the approach in a wide variety of industrial and organizational settings suggest that there is no one best program design. However, the authors feel that several basic design issues must be addressed in all cases. They have chosen to call these issues: authority, independence, program boundaries, auditor qualifications, and procedures for audit, for reporting and for follow-up. Experience over the past six years in design and operation of a program to serve Allied Corporation, a large diverisified manufacturer, are discussed within the context of the seven basic design issues. 1 figure.

48787 (CONF-841187—Vol.1, pp 101-105) **Effective environmental auditing on a 200,000 acre plant site.** Heckrotte, R.W. (E.I. du Pont de Nemours and Co., Aiken, SC). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

At the Department of Energy Savannah River Plant (SRP) Du Pont operates three large nuclear reactors, two radiochemical separation plants, a fuel and target manufacturing plant, several laboratories, seven coal-burning powerhouses, a large construction program, a railroad, and numerous raw materials and waste storage and treatment facilities. The diversity of plant activities, large number of employees, and the distances between operations on the 300 square mile site make effective environmental auditing both difficult and necessary. Audits are designed to reveal environmental threats or regulatory infractions. Auditors need a good working knowledge of rules and regulations. Because most infractions result from ignorance of rules rather than deliberate action, auditing is largely a process of educating plant personnel. Techniques useful in improving SRP's auditing effectiveness include: cross-audits within the plant, in which one area's personnel audit another area; cross-audits with Du Pont commercial sites; establishment of proper policies and procedures, including clear management policy on compliance with environmental regulations: maintenance of proper records; strict accountability and prompt followup.

48788 (CONF-841187—Vol.1, pp 321-333) **Application of 5700.6B, quality assurance, to ES & H programs: Mound's approach and results.** Edling, D.A. (Monsanto Research Corp., Miamisburg, OH). Apr 1985. NTIS, PC A17/MF A01. File Number DE85018025. Contract AC04-76DP00053.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

Quality Assurance has always been integral to Mound's production and support operations. Weapons material and other designated material for WR programs are processed and controlled per the requirements of DOE/AL Quality Control Policy QC-1. Mound's non-WR activities, such as siting, design, construction, testing, operation, maintenance, development and production of materials, components, and systems, and acquisition of research and technology data are to be processed and controlled per the requirements of AL Order 5700.6. This paper presents an overview of the entire Quality Assurance Program at Mound and specifically addresses Mound's formal application of Quality Assurance to our comprehensive Environmental, Safety and Health (ES & H) Programs. 4 figures, 1 table.

48789 (CONF-841187—Vol.2, pp 621-627) **Status of the graphic overview system in relation to Department of Energy facilities.** Berry, H.A. (EG & G Energy Measurements, Inc., Las Vegas, NV). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

The Graphic Overview System (GOS) is a compilation of maps, photos, and summary information of environmental programs

and related data for Department of Energy (DOE) sites. The information, in the form of colored overlays, consists of environmental monitoring locations, effluent release points, onsite storage locations, NPDES permit locations, aerial survey results, demographic and meteorological data, and other general information. The results provide a working tool for DOE management and contractors to review and visualize the relationship among environmental programs. In addition, the user can place in proper perspective key aspects of all environmental programs and related information to evaluate the resulting public and environmental impact of the site. Since its inception, the GOS has been expanded to include nonradiological monitoring and site planning and development information. To date, packages for 14 DOE sites have been completed. The package most recently completed, on the Nevada Test Site, contains a considerable amount of historical information. A comprehensive revision and update of the package for the Savannah River Plant is currently in progress. GOS packages serve many function besides being a tool for reviewing a facility's programs. The packages have been used in court litigation, program planning, public hearings, and both technical and nontechnical briefings and reports. GOS packages also serve as an excellent tool for emergency planning purposes by providing a set of maps and site information and programs on a common scale.

48790 **(IIUG-pre—85-6) Technology development in the field of tension between its intrinsic dynamics and the goals defined in the public discussion. Nuclear energy, microelectronics and genetic engineering: a comparative approach.** Joerges, B.; Bechmann, G.; Hohlfeld, R. (Wissenschaftszentrum Berlin (Germany, F.R.). Internationales Inst. fuer Umwelt und Gesellschaft). 1985. 33p. (In German). NTIS, PC E02; Available from NTIS as TIB/A86-08609.

Taking the three examples of nuclear energy, microelectronics and genetic engineering, an analytic perspective is proposed which goes beyond conventional technology assessment. A comparative approach to the analysis of these three consecutive developments is suggested focusing on their physical and social substitutional functions, relevant actor games and control mechanisms, and cultural assimilation. Finally, the issue of 'autonomy' or 'Eigendynamik' of modern science and technology is discussed.

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5501 Behavioral Biology

REFER ALSO TO CITATION(S) 48928, 48934

48791 **Phytoplankton dynamics within Gulf Stream intrusions on the southeastern United States continental shelf during summer 1981.** Yoder, J.A.; Atkinson, L.P.; Bishop, S.S.; Blanton, J.O.; Lee, T.N.; Pietrafesa, L.J. (Skidaway Institute of Oceanography, Savannah, GA). *Continental Shelf Research;* 4: No. 6, 611-635(1985).

During July and August 1981 subsurface intrusion of upwelled nutrient-rich Gulf Stream water was the dominant process affecting temporal and spatial changes in phytoplankton biomass and productivity of the southeastern US continental shelf between 29 and 32°N latitude. Intruded waters in the study area covered as much as 10 km including virtually all of the middle and outer shelf and approximately 50% of the inner shelf area. Within 2 weeks following a large intrusion event in late July, middle shelf primary production and Chl a reached 3 to 4 gC m^{-1} d^{-1} and 75 mg m^{-1}, respectively. At the peak of the bloom 80% of the water column primary production occurred below the surface mixed-layer, and new primary production (i.e., NO_3-supported) exceeded 90% of the total. Chl a-normalized photosynthetic rates were very high as evidenced by high mean assimilation number (15.5 mg C mg Chl a^{-1} h^{-1}), high mean a (14 mg C mg Chl a^{-} Ein^{-1} m), and no photoinhibition. As a result of the high photosynthetic rates, mean light-utilization index (Pai) was 2 to 3 times higher than reported for temperature sub-arctic and arctic waters. The results imply a seasonal (June to August) middle shelf production of 150 g C m^{-1}, about 15% higher than previous estimates of annual production on the middle shelf. Intrusions of the scale they observed in 1981 may not occur every summer. However, when such events do occur, they are by far the most important processes controlling summer photoplankton dynamics of the middle and outer shelf and of the inner shelf in the southern half of the study area. 57 references, 13 figures, 5 tables.

5502 Biochemistry

REFER ALSO TO CITATION(S) 48186, 48447, 48448, 48816, 48818, 48862, 48916, 48917, 48928

48792 **(INIS-mf—10175) Binding of [^{125}I] Concanavalin A to isolated Langerhans islets of rats.** Prey, N. (Ulm Univ. (Germany, F.R.). Fakultaet fuer Klinische Medizin). 28 Jan 1983. 63p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752569.

Langerhans islets of rats were isolated using Lacy's collagenase technique and were incubated in vitro. The binding of iodine-labelled Concanavalin A to isolated Langerhans islets was investigated. We were unable to decide whether multiple Concanavalin A binding sites are located on the cell membrane, or whether the Concanavalin A binding sites are negatively influenced via a allosteric protein. Although the secretion mechanism induced by sulfonyl urea is not influenced by Concanavalin A, enhanced binding of Concanavalin A indicates that the region of identification cannot be identical for glucose and sulfonyl urea.

48793 **Interaction of fructose with the glucose permease of the cyanobacterium Synechocystis sp. strain PCC 6803.** Flores, E.; Schmetterer, G. (Michigan State Univ., East Lansing). *Journal of Bacteriology;* 166: No. 2, 693-696(May 1986). Contract AC02-76ER01338.

Fructose was bactericidal for the cyanobacterium Synechocystis sp. strain PCC 6803. Each of ten independently isolated fructose-resistant mutants had an alteration of the glucose transport system, measured as uptake of glucose or of 3-0-methyl-D-glucose. In the presence of the analog, the wild-type Synechocystis strain was protected against fructose. Two mutants altered in photoautotrophy were also isolated.

48794 **Role of glutamine synthetase adenylylation in the self-protection of Pseudomonas syringae subsp. tabaci from its toxin, tabtoxinine-β-lactam.** Knight, T.J.; Durbin, R.D.; Langston-Unkefer, P.J. (Los Alamos National Lab., NM). *Journal of Bacteriology;* 166: No. 1, 224-229(Apr 1986).

Selected pathovars of Pseudomonas syringae produce an extracellular phytotoxin, tabtoxinine-β-lactam, that irreversibly inhibits its known physiological target, glutamine synthetase (GS). Pseudomonas syringae subsp. tabaci retains significant amounts of glutamine synthetase activity during toxin production in culture. As part of our investigation of the self-protection mechanism(s) used by these pathovars, we have determined that GS becomes adenylylated after toxin production is initiated and that the serine released from the zinc-activated hydrolysis of tabtoxin is a factor in the initiation of this adenylylation. The adenylylation state of this GS was estimated to range from E/sub 5.0-7.5/. The irreversible inactivation by tabtoxinine-β-lactam of unadenylylated and adenylylated glutamine synthetase purified from P. syringae subsp. tabaci was investigated. Adenylylated GS was inactivated by tabtoxinine-β-lactam at a slower rate that was unadenylylated enzyme. Adenylylated GS (E/sub 7.5-10.5/) was significantly protected from this inactivation in the presence of the enzyme effectors, AMP, Ala, Gly, His, and Ser. Thus, the combination of the adenylylation of GS after toxin production is initiated and the presence of the enzyme effectors in vivo could provide part of the self-protection mechanism uses by subsp. tabaci.

48795 **Purification and characterization of glucose oxidase from ligninolytic cultures of Phanerochaete chrysosporium.** Kelley, R.L.; Reddy, C.A. (Michigan State Univ., East Lansing). *Journal of Bacteriology;* 166: No. 1, 269-274(Apr 1986).

Glucose oxidase, an important source of hydrogen peroxide in lignin-degrading cultures of Phanerochaete chrysosporium, was purified to electrophoretic homogeneity by a combination of ion-

exchange and molecular sieve chromatography. The enzyme is a flavoprotein with an apparent native molecular weight of 180,000 and a denatured molecular weight of 80,000. This enzyme does not appear to be a glycoprotein. It gives optimal activity with D-glucose, which is stoichiometrically oxidized to D-gluconate. The enzyme has a relatively broad pH optimum of 4 to 5. It is inhibited by Ag^{+} (10 mM) and o-phthalate (100 mM), but not by Cu^{2+}, NaF, or KCN (each 10 mM).

5503 Cytology

REFER ALSO TO CITATION(S) 48863

48796 Diffusion-limited forward rate constants in two dimensions: application to the trapping of cell surface receptors by coated pits. Goldstein, B.; Griego, R.; Wofsy, C. (Los Alamos National Lab., NM). *Biophysical Journal;* **46**: 573-586(Nov 1984).

In this paper, the authors explore implications in receptor aggregation and internalization of the two types of recycling models that have been proposed for the maintenance of the coated pit concentration. In one model, coated pits alternate between accessible and inaccessible states at fixed locations on the cell surface, while in the other model, coated pits recycle to random locations on the cell surface. The authors consider receptors that are randomly inserted in the membrane, move by pure diffusion with diffusion coefficient D, and are instantly and irreversibly trapped when they reach a coated pit boundary (the diffusion limit). For such receptors, the authors calculate for each of the two models: the mean time tau to reach a coated pit, the forward rate constant k/sub +/ for the interaction of a receptor with a coated pit, and the fraction phi of receptors aggregated in coated pits. The authors show that for the parameters that characterize coated pits on human fibroblasts, the way in which coated pits return to the surface has a negligible effect on the values of tau, K/sub +/, and phi for mobile receptors, D Γ 1.0 x10^{-11} cm^2/s, but has a substantial effect for immobile receptors, D << 1 x 10^{-11} cm^2/s. The authors present numerical examples to show that it may be possible to distinguish between these models if one can monitor slowly diffusing receptors (D < 1 x 10^{-11} cm^2/s) on cells whose coated pits have relatively short lifetimes(∂ 1 min). Finally, the authors show that for the low-density lipoprotein (LDL) receptor on human fibroblasts (D = 4.5 x 10^{-11} cm^2/s), the predicted and observed values of /sub +/ and phi are in close agreement. Therefore, even for the slowly diffusing receptor, unaided diffusion as the transport mechanism of receptors to coated pits is consistent with measured rates of LDL internalization 36 references, 4 figures, 1 table.

5505 Metabolism

48797 (INIS-mf—10194) Fate of purified radio-labelled alkaline phosphatase from the liver in the organism. An experimental study in dogs. Herbert, V. (Marburg Univ. (Germany, F.R.). Fachbereich Humanmedizin). 27 Mar 1981. 109p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752591.

Alkaline phosphatase (AP) from dog liver was enriched by a factor of 5.444 in various steps. Rabbit antiserum to the purified AP was produced; 125-I was used then to radiolabel the highly purified AP. Four dogs were cholecystectomized and subsequently received an extracorporal drainage of the bile ducts. Decrease rate of total radioactivity and of PBI in the serum was determined in one dog; likewise in three other dogs before and one week after occlusion of their main bile ducts. In addition, radioactivity above the organs was measured in some animals at short intervals. In the dogs with main bile duct drainage, bile was collected continuously for up to 70 h, samples were taken, and residual bile plus native dog bile were re-infused into the distal choledochus catheter. Total radioactivity, PBI and immunoprecipitability with antibodies were determined in the bile and serum samples. AP, GOT, CPT and bilirubin were determined in some serum samples. In addition, total radioactivity excreted by urine was established. Results show injected 125-I-AP to be rapidly stored in the liver and not to be excreted via bile to a decisive extent. The fact that 125-I-AP is not excreted via bile is further indicated by the identical decrease rate of injected 125-I-AP in the serum in dogs with and without main bile duct occlusion. Injected 125-I-AP appears to be metabolized very rapidly in the liver as is indicated by the rapid decrease of immuno precipitability of 125-I-AP in the serum.

48798 (OEFZS-A—0756, pp 34) Determination of iron levels in cutaneous porphyrias. Kosa, A.; Horkay, I.; Altmann, H.; Teherani, D.K. (University Medical School, Debrecen, Hungary. Dept. of Dermatology; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

5506 Medicine

REFER ALSO TO CITATION(S) 47212, 47778, 47778, 48084, 48211, 48624, 48798, 48854, 48917, 48923

48799 (BNL—38283) Non-invasive techniques for measuring body composition: state of the art and future prospects. Cohn, S.H. (Brookhaven National Lab., Upton, NY (USA)). 1985. Contract AC02-76CH00016. 20p. (CONF-8505112—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013909.

From 2. international symposium on the biology and toxicology of metals using nuclear analytical methods; Upton, NY, USA (20 May 1985).

In the past 20 years, in vivo analysis of body elements by neutron activation has become an important tool in medical research. In particular, it provides a much needed means to make quantitative assessments of body composition of human beings in vivo. The data are useful both for basic physiological understanding and for diagnosis and management of a variety of diseases and disorders. This paper traces the development of the in vivo neutron activation technique from basic systems to the present state of the art facilities. A scan of some of the numerous clinical applications that have been made with this technique, reveals the broad potentialities of in vivo neutron activation. The paper also considers alternative routes of future development and raises some of the questions now faced in making the techniques more widely available to both medical practitioners and medical investigators. In vivo neutron activation has opened a new era of both clinical diagnosis and therapy evaluation, and investigation into the modelling of body composition. The techniques are new, but it is already clear that considerable strides can be made in increasing accuracy and precision, increasing the number of elements susceptible to measurement, and reducing the dose required for the measurement. 18 refs., 7 figs.

48800 (BNL—51997) Workshop on photon activation therapy: proceedings. Fairchild, R.G. (ed.). (Brookhaven National Lab., Upton, NY (USA)). 18 Apr 1985. Contract AC02-76CH00016. 58p. (CONF-8504258—). NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86013672.

From Workshop on photon activation therapy; Upton, NY, USA (18 Apr 1985).

This Workshop was held concurrently with an IAEA Research Coordination Meeting on Exploration of the Possibility of High-LET Radiation for Non-conventional Radiotherapy in Cancer. The Workshop on Photon Activation Therapy (PAT) was given as a special session on April 18, as it was thoght PAT might eventually be found to be attractive to developing countries, which is a major concern of the IAEA. An effort was made to bring together representatives of the various groups known to be actively working on PAT; these included investigators from Sweden and Japan as well as the US. It is hoped that this compendium of papers will be of use to those currently active in this developing field, as well as to those who might join this area of endeavor in the future.

48801 **(DOE/EV/03333—T6) Positron emission tomography (PET) analysis of the effects of auditory stimulation on the distribution of ^{11}C-N-methylchlorphentermine in the brain.** Paschal, C.B. (Massachusetts Inst. of Tech., Cambridge (USA)). Jun 1986. Contract AC02-76EV03333. 83p. MIT, 77 Mac achusetts Ave., Cambridge, MA 02139. File Number TI86012565.

Thesis.

This experimental work was launched to study how auditory stimulation effects blood flow in the brain. The technique used was Positron Emission Tomography (PET) with ^{11}C-N-methylchlorphentermine (^{11}C-NMCP) as the tracer. ^{11}C-NMCP acts as a molecular microsphere and thus measures blood flow. The objectives of this work were: to develop, test, and refine an experimental procedure, to design and construct a universally applicable positioning device, and to develop and test a synthesis for a radiopure solution of ^{11}C-NMCP; all were accomplished. PET was used to observe the brain distribution of ^{11}C-NMCP during binaural and monaural stimulation states. The data was analyzed by finding the signal intensity in regions of the image that represented the left and right interior colliculi (IC's), brain structures dedicated to the processing of auditory signals. The binaural tests indicated a statistically significant tendency for slightly higher concentration of the tracer in the left IC than in the right IC. The monaural tests combined with those of the binaural state were not solidly conclusive, however, three of the four cases showed a decrease in tracer uptake in the IC opposite the zero-stimulus ear, as expected. There is some indication that the anesthesia used in the majority of this work may have interferred with blood flow response to auditory stimulation. 39 refs., 17 figs., 3 tabs.

48802 **(DOE/EV/04533—8) Efficacy of clinical diagnostic procedures utilized in nuclear medicine. Final report, August 1977-November 30, 1983.** Saenger, E.L. (Cincinnati Univ. Medical Center, OH (USA)). Jun 1986. Contract AC02-77EV04533. 93p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014661.

This report describes a study of 2023 patients comparing two methods of evaluating the efficacy of lung scanning in patients suspected of having pulmonary embolism (PE). Only the referring physicians determined the probability of the most important (MI) and most likely (ML) diagnoses, and management, before and after lung scanning. A logistic regression model was developed for the probability of a signout diagnosis of PE. Equal patient groups tested the validity of the regression equations for the probability of PE both before and after the lung scan. The models developed on half the data (Group I) were then tested on the second half of the data set (Group II) to determine their ability to predict with similar results. This shows that the lung scan classifies PE and NOT PE patients well. Entropy minimax pattern detection (EMPD) attempts to predict the diagnosis and management from prior patient attributes. In 2023 cases, attributes alone could not iminate the use of lung scans for all patients. Comparing the two analytic methods, the predictive value, sensitivity, specificity and accuracy of each method are similar. However, EMPD predicts on a relatively small percent of cases (40% prior and 715 post scan) while logistic regression equations predict on 100% of cases. 29 refs., 2 figs., 16 tabs.

48803 (INIS-mf—10173, pp 26) **Development studies of a new gamma camera for positron emission tomography.** Schotanus, P.; Eijk, C.W.E. van; Hollander, R.W.; Pijpelink, J. (Technische Hogeschool Delft, Netherlands). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48804 (INIS-mf—10173, pp 27) **Multiwire detectors for use in time-resolved experiments from muscle.** Faruqi, A.R. (Medical Research Council, Cambridge, UK). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

48805 (INIS-mf—10192) **Radioimmunological determination of oestetrol in plasma in normal and pathological pregnancies.** Roelleke, M. (Koeln Univ. (Germany, F.R.). Medizinische Fakultaet). 6 Sep 1982. 89p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752589.

The radioimmunological method presented for the determination of oestetrol is suitable for measuring the concentration of this hormone in the plasma. Measuring range, accuracy and precision are comparable to those of other methods. This method will be as easy to handle as the oestriol determination method if a specific antiserum is available. The concentration of oestetrol in normal pregnancy ranges between 0.745 ng/ml in the 22nd pregnancy week and 2.501 ng/ml in the 40th p.w. when determined by means of the unspecific antiserum I; when using the specific antiserum II, it ranges between 0.267 ng/ml in the 22nd p.w. and 1.370 ng/ml in the 40th p.w., oestetrol plasma level hardly changes until the 30th p.w.; afterwards the level rises continuously till the end of gestation period. A daily rhythm was not found for oestetrol. A rapid drop in hormone concentration occurs when treated with betamethasone, β-sympathomimetics and ampicillin; however, hormon concentration begins to increase soon afterwards. Patients suffering from diabetes mellitus do not show the course of the oestetrol plasma level to deviate from the normal range. In cases of infra-uterine development insufficiency, children having a birth weigth below 25 and above 10 percentile according to Lubchenco reveal a rise in concentration corresponding to the norm. Children revealing a additional symptoms of dystrophy have an average hormone concentration lower by about one third. Patients whose children reveal a birth weight below the 10 percentile according to Lubchenco, do not show any further increase in the concentration of this hormone after the 35th p.w.

48806 (OEFZS-A—0686, pp 28) **Open questions in reaction mechanism of radontherapy.** Mukherjee, R.; Altmann, H. (International Atomic Energy Agency, Vienna, Austria; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Jun 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-8506290—Absts.; BL—508/85).

From International symposium on drug therapy and alternative therapy methods; Sopron, Hungary (21 Jun 1985).

48807 **(OEFZS-A—0686) International Symposium on drug therapy and alternative therapy methods.** (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Jun 1985. 42p. (In German and English). (CONF-8506290—Absts.; BL—508/85). Institute for Biology, OEFZS, A-2444 Seibersdorf, Austria.

From International symposium on drug therapy and alternative therapy methods; Sopron, Hungary (21 Jun 1985).

This report is a collection of abstracts of presentations held at the International Symposium on drug therapy and alternative therapy methods. Some of these abstracts are within the subject scope of INIS and these abstracts are treated separately for INIS. A publication of proceedings of this conference is planned for the end of 1986.

48808 (OEFZS-A—0686, pp 11-12) **Control of ion transport in the heart muscle by new antiarrhythmicas.** Somogyi, J.; Ver, A.; Muellner, N.; Turi, A.; Kovacs, T.; Manyai, S. (Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary. 2. Kemiai Biokemiai Intezet; Orvostudomanyi Egyetem, Debrecen, Hungary; EGIS Pharmazeutische Werke, Budapest, Hungary). Jun 1985. (In German). Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-8506290—Absts.; BL—508/85).

From International symposium on drug therapy and alternative therapy methods; Sopron, Hungary (21 Jun 1985).

48809 (OEFZS-A—0686, pp 37) **Medium power YAG laser treatment of rheumatoid arthritis.** Barabas, K.; Balint, G.; Meretey, K.; Reviczky, A.; Toeroes, E.; Dunky, A.; Eberl, R.; Altmann, H.; Pinterits, G.; Topaloglou, A. (Orszagos Reuma- es Fizioterapias Intezet, Budapest, Hungary. Koezponti Izotoplaboratorium; Krankenhaus der Stadt Wien-Lainz, Austria. 2. Medizinische Abt.; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Jun 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-8506290—Absts.; BL—508/85).

From International symposium on drug therapy and alternative therapy methods; Sopron, Hungary (21 Jun 1985).

48810 **Efficiency index: a new parameter to define breathing patterns during dynamic Xe-127 ventilation studies.** Slosman, D.; Susskind, H.; Bossuyt, A.; Tang, Y.N.; Brill, A.B. (Brookhaven National Lab., Upton, NY). *Federation Proceedings, Federation of American Societies for Experimental Biology;* **45**: No. 3, 392(1 Mar 1986). (CONF-8604222—).

From 70. annual meeting of the Federation of American Society for Experimental Biology; St. Louis, MO, USA (13 Apr 1986).

Ventilation imaging can be improved by gating scintigraphic data with the respiratory cycle using temporal Fourier analysis (TFA) to quantify the temporal behavior of the ventilation. Sixteen consecutive images, representing equal-time increments of an average respiratory cycle, were produced by TFA in the posterior view on a pixel-by-pixel basis. An Efficiency Index (EFF), defined as the ratio of the summation of all the differences between maximum and minimum counts for each pixel to that for the entire lung during the respiratory cycle, was derived to describe the pattern of ventilation. The gated ventilation studies were carried out with Xe-127 in 12 subjects: normal lung function (4), small airway disease (2), COPD (5), and restrictive disease (1). EFF for the first three harmonics correlated linearly with FEV1 ($r = 0.701$, $p < 0.01$). This approach is suggested as a very sensitive method to quantify the extent and regional distribution of airway obstruction.

48811 **No-carrier-added [^{18}F]-N-methylspiroperidol.** Shiue, C.Y.; Fowler, J.S.; Wolf, A.P. (to Dept. of Energy). US Patent Application 6-784,149. 4 Oct 1985. 24p. Contract AC02-76CH00016. DE86013761 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013761.

The present invention is directed to the synthesis of a radioligand, labeled with a positron emitting radionuclide which is suitable for dynamic studies in humans using positron emission transaxial tomography. No-carrier-added (NCA) [^{18}F]-N-methylspiroperiodl is prepared from four different sustrates: p-nitrobenzonitrile, cyclopropyl p-nitrophenyl ketone, p-cyclopropanoyl-N,N,N-trimethylanilinium iodide and p-cyclopropanoyl-N,N,N-trimethylanilinium perchlorate. The process for the production of NCA [^{18}F]-N-methylspiroperidol is a nucleophilic aromatic substitution reaction. Furthermore, the compound of this invention is shown to be effective as a new drug of choice for in vivo examination of dopamine binding sites in a human brain. In particular, this drug is primarily useful in the noninvasive technique of positron emission transaxial tomography (PETT).

48812 **Method for the simultaneous preparation of radon-211, xenon-125, xenon-123, astatine-211, iodine-125 and iodine-123.** Mirzadeh, S.; Lambrecht, R.M. (to Dept. of Energy). US Patent Application 6-750,123. 1 Jul 1985. 28p. Contract AC02-76CH00016. DE86013698 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013698.

The invention relates to a practical method for commercially producing radiopharmaceutical activities and, more particularly, relates to a method for the preparation of about equal amount of Radon-211 (^{211}Rn) and Xenon-125 (^{125}Xe) including a one-step chemical procedure following an irradiation procedure in which a selected target of Thorium (^{232}Th) or Uranium (^{238}U) is irradiated. The disclosed method is also effective for the preparation in a one-step chemical procedure of substantially equal amounts of high purity ^{123}I and ^{211}At. In one preferred arrangement of the invention almost equal quantities of ^{211}Rn and ^{125}Xe are prepared using a onestep chemical procedure in which a suitably irradiated fertile target material, such as thorium-232 or uranium-238, is treated to extract those radionuclides from it. In the same one-step chemical procedure about equal quantities of ^{211}At and ^{123}I are prepared and stored for subsequent use. In a modified arrangement of the method of the invention, it is practiced to separate and store about equal amounts of only ^{211}Rn and ^{125}Xe, while preventing the extraction or storage of the radionuclides ^{211}At and ^{123}I.

5507 Microbiology

REFER ALSO TO CITATION(S) 47312, 47388

48813 **(DOE/ER—0289) Microbial metabolism of aromatic compounds under anaerobic conditions.** Berry, D.F.; Francis, A.J.; Bollag, J.M. (Pennsylvania State Univ., University Park (USA). Soil Microbiology Lab.; Brookhaven National Lab., Upton, NY (USA). Applied Science Dept.). Jun 1986. Contract AC02-76CH00016. 73p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014211.

Recent studies on the anaerobic biodegratation of haloaromatic and aromatic compounds clearly demonstrate the importance of anaerobic microbial transformations of organic compounds in anoxic environments. This paper presents a critical review of the available scientific information on the anaerobic microbial metabolism of homo- and heterocyclic aromatic compounds, with emphasis on various anaerobic microbial processes and metabolic pathways.

48814 **Phenotypic characterization of 10 methanol oxidation mutant classes in Methylobacterium sp. strain AM1.** Nunn, D.N.; Lidstrom, M.E. (Univ. of Washington, Seattle). *Journal of Bacteriology;* **166**: No. 2, 591-597(May 1986). Contract AT06-80ER10680.

Twenty-five methanol oxidation mutants of the facultative methylotroph Methylobacterium sp. strain AM1 have been characterized by complementation analysis and assigned to 10 complementation groups, Mox A1, A2, A3, and B through H. In this study we have characterized each of the mutants belonging to the 10 Mox complementation groups for the following criteria: (i) phenazine methosulfate-dichlorophenolindophenol dye-linked methanol dehydrogenase activity; (ii) methanol-dependent whole-cell oxygen consumption; (iii) the presence or absence of methanol dehydrogenase protein by sodium dodecyl sulfate-polyacrylamide gel electrophoresis and Western blotting; (iv) the absorption spectra of purified mutant methanol dehydrogenase proteins; and (v) the presence or absence of the soluble cytochrome c proteins of Methylobacterium sp. strain AM1, as determined by reduced-oxidized difference spectra and sodium dodecyl sulfate-polyacrylamide gel electrophoresis. With this information, we have proposed functions for each of the genes deficient in the mutants of the 10 Mox complementation groups. These proposed gene functions include two linked genes that encode the methanol dehydrogenase structural protein and the soluble cytochrome c/sub L/, a gene encoding a secretion function essential for the synthesis and export of methanol dehydrogenase and cytochrome c/sub L/, three gene functions responsible for the proper association of the pyrrolo-quinoline quinone prosthetic group with the methanol dehydrogenase apoprotein, and four positive regulatory gene functions controlling the expression of the ability to oxidize methanol.

48815 **Isolation and complementation analysis of 10 methanol oxidation mutant classes and identification of the methanol dehydrogenase structural gene of Methylobacterium sp. strain AM1.** Nunn, D.N.; Lidstrom, M.E. (Univ. of Washington, Seattle). *Journal of Bacteriology;* **166**: No. 2, 581-590(May 1986). Contract AT06-80ER10680.

A method has been developed for the direct selection of methanol oxidation mutants of the facultative methylotroph Methylobacterium sp. strain AM1 (formerly Pseudomonas sp. strain AM1). Using this direct selection technique, we have isolated mutants of Methylobacterium sp. strain AM1 that are no longer capable of growth on methanol but retain the ability to grow on methylamine. These methanol oxidation (Mox) mutants were complemented with a genomic clone bank of this organism constructed in the broad-host-range cosmid pVK100, and subcloning and Tn5 mutagenesis experiments have assigned the Mox mutants to 10 distinct

complementation groups. Using an open reading frame beta-galactosidase fusion vector and antibodies specific for Methylobacterium sp. strain AM1 methanol dehydrogenase, we have identified the methanol dehydrogenase structural gene and determined the direction of transcription. The results suggest that the synthesis and utilization of an active methanol dehydrogenase in this organism requires at least 10 different gene functions.

48816 **Gyrase activity and number of copies of the gyrase B subunit gene in Haemophilus influenzae.** Cabrera-Juarez, E.; Setlow, J.K. (Brookhaven National Lab., Upton, NY). *Journal of Bacteriology;* **164**: No. 2, 535-538(Nov 1985).

Gyrase activities in extracts of various strains of Haemophilus influenzae can differ by more than an order of magnitude. Measurements of in vitro activity and copy number indicated that most of these differences arose from variations in the number of copies of the gene for the gyrase B subunit, with some strains containing multicopy plasmids coding for that subunit. The quantitative relationship between gyrase and copy number depended on the mutations in the plasmids and in the host. The possibility that the in vivo gyrase activity did not reflect the in vitro data was explored by measurement of alkaline phosphatase and ATPase activity in the extracts. Alkaline phosphatase activity increased with increasing gyrase activity measured in vitro, but ATPase activity did not. The authors conclude that extra supercoiling enhanced transcription of the alkaline phosphatase gene but not the ATPase gene and that it is unlikely that there is much discrepancy between gyrase activity assayed in vitro and the activity in the cell.

48817 **Antigenic mosaic of Methanosarcinaceae: partial characterization of Methanosarcina barkeri 227 surface antigens by monoclonal antibodies.** Garberi, J.C.; Macario, A.J.L.; De Macario, E.C. (New York State Dept. of Health, Albany). *Journal of Bacteriology;* **164**: No. 1, 1-6(Oct 1985). Contract AC02-81ER10880;FG02-84ER13197.

Hybridomas were constructed with spleen cells from mice immunized against Methanosarcina barkeri 227. The reaction with the resulting monoclonal antibodies identified two antigenic determinants. Determinant 8A is present in M. barkeri 227, where it is accessible to antibody on whole bacterial cells. 8A is undetectable in (or absent from) M. barkeri R1M3, an immunologically closely related strain. Determinant 8C is present in both strains, but with M. barkeri 227 it is found only in extracts and cannot be demonstrated in whole cells. It therefore appears to be hidden. A soluble form of antigen 8A (antigen 227) was obtained treating whole M. barkeri 227 cells with absolute methanol. This antigen was further purified by affinity chromatography with antibody 8A. Chemical and immunochemical analyses of these preparations showed that antigen 227 is a high-molecular-weight (4×10^5) structure composed mainly of one carbohydrate, glucose, and small amounts of amino acids. Its solubility properties suggest that this molecule is associated with a lipid moiety.

48818 **Pyrimidine-specific cleavage by an endoribonuclease of Saccharomyces cerevisiae.** Stevens, A. (Oak Ridge National Lab., TN). *Journal of Bacteriology;* **164**: No. 1, 57-62(Oct 1985). Contract AC05-84OR21400.

An endoribonuclease with pyrimidine cleavage site specificity was isolated from Saccharomyces cerevisiae. The enzyme had a pH optimum of 6 to 7 and did not require a divalent cation. It was inhibited by 5×10^{-5} M hetidium bromide, although it appeared to be single strand specific. The enzyme gave a limited cleavage of yeast mRNA and rRNA, yielding products that were terminated with pyrimidine nucleoside 2',3'-cyclic phosphate. The bonds between pyrimidine and A residues constituted more than 90% of the scission sites when the average product size was 50 nucloetides. Homopolyribonucleotides were cleaved poorly. Poly(A,U) was cleaved rapidly, and analysis of the products of poly(A,U) hydrolysis showed a very stringent cleavage of U-A bonds.

5508 Morphology

REFER ALSO TO CITATION(S) 48906

5510 Physiological Systems

REFER ALSO TO CITATION(S) 48075, 48801

48819 **Effect of photoperiod on gibberellin biosynthetic enzymes in spinach.** Gilmour, S.J.; Bleecker, A.B.; Zeevaart, J.A.D. (Michigan State Univ., East Lansing). **80**: No. 4, 33(Apr 1986). Contract AC02-76ER01338.

From Annual meeting of the American Society of Plant Physiologists; Baton Rouge, LA, USA (8-12 Jun 1986).

The photoperiodic control of stem elongation in spinach, a long day (LD) rosette plant, is mediated by gibberellins (GA_s). The early 13-hydroxylated GA biosynthetic pathway from GA_{12} to GA_{20} operates in spinach: $GA_{12} \rightarrow GA_{53} \rightarrow GA_{44} \rightarrow GA_{19} \rightarrow GA_{20}$. Two enzymes of this pathway, those converting GA_{53} to GA_{44} (GA_{53} oxidase) and GA_{19} to GA_{20} (GA_{19} oxidase), are regulated by light. The enzyme converting GA_{44} to GA_{19} (GA_{44} oxidase) is not light-regulated. In the light GA_{53} and GA_{19} oxidase activities are increased, therefore causing the GA biosynthetic pathway to be turned on. This leads to the production of an active GA in LD, which causes an increase in stem elongation. Two the enzymes, GA_{44} and GA_{53} oxidases, can be separated from one another by anion exchange HPLC. Estimates of the molecular weights of these two enzymes based on gel filtration HPLC will be reported.

48820 **Mutants of Arabidopsis as tools for physiology and molecular biology.** Somerville, C.R.; Artus, N.; Browse, J.; Caspar, T.; Estelle, M.; Haughn, G.; Kunst, L.; Martinez, J.; McCourt, P.; Moffatt, B. (Michigan State Univ., East Lansing). **80**: No. 4, 2(Apr 1986).

From Annual meeting of the American Society of Plant Physiologists; Baton Rouge, LA, USA (8-12 Jun 1986).

The authors discuss the importance of developing a facile system for genetic analysis in higher plants which can be used to approach problems specific to plant biology in much the same way that molecular genetic approaches have been used in other classes of organisms such as yeast and Drosophila. Toward this end, they have developed methods for the isolation and analysis of mutants of Arabidopsis with specific alterations in photosynthesis, photorespiration, starch metabolism, lipid metabolism, purine metabolism, amino acid metabolism and phytohormone responses. The utility of this collection of mutants for studying problems in physiology and biochemistry is illustrated with selected examples.

48821 **Oat tonoplast H^+/Ca^{2+} antiport is a reversible, electrogenic transport system.** Schumaker, K.S.; Sze, H. (Univ. of Maryland, College Park). **80**: No. 4, 25(Apr 1986). Contract AS05-82ER13015.

From Annual meeting of the American Society of Plant Physiologists; Baton Rouge, LA, USA (8-12 Jun 1986).

The oat root tonoplast H^+/Ca^{2+} antiport was characterized directly using an artificially generated pH gradient (acid inside). Tonoplast vesicles are isolated from a 0/4% dextran interface. These membranes are enriched in ATPase activity and ATP-dependent 45-Ca^{2+} uptake that are nitrate-sensitive and azide-resistant. Ca^{2+} uptake is coupled to the efflux of H^+ as increasing Ca^{2+} concentrations could progressively dissipate a pH gradient. The Km of the antiport for Ca^{2+} is 10 μM. La^{3+} (50 μM), ruthenium red (25 μM) and N,N'-dicyclohexylcarbodiimide (3 μM) inhibited Ca^{2+} uptake but had no effect on the formation of ΔpH. The H^+/Ca^{2+} is electrogenic (generating a positive interior potential) as demonstrated by the uptake of [14-C]SCN^-. Furthermore, an artificially imposed membrane potential (interior negative) stimulated Ca^{2+} uptake while a positive potential decreased uptake. The antiport is reversible as a Ca^{2+} gradient (Ca^{2+}/sub in/ > Ca^{2+}/sub out/) could drive formation of a pH gradient (acidic inside).

48822 Frequency content of forced exhalations of normal rats. Mauderly, J.L.; Seiler, F.A. (Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM). *Federation Proceedings, Federation of American Societies for Experimental Biology;* **45**: No. 3, 312(1 Mar 1986). (CONF-8604222—). Contract AC04-76EV01013.

From 70. annual meeting of the Federation of American Society for Experimental Biology; St. Louis, MO, USA (13 Apr 1986).

The frequency content of the flow-time relationship during forced exhalation determines the equipment response characteristics required for measurements of small animals. Flow-time data were collected by flow plethysmography at 1 msec intervals during single forced exhalations of 22 male and 22 female 14 wk old, healthy, anesthetized F344/N rats. Lungs of apneic rats were inflated to 30 cm H_2O transpulmonary pressure and deflated at -50 cm H_2O airway pressure. Similar data were collected from the testing system without a rat. Amplitudes and phases at 4 Hz intervals from 4 to 96 Hz Hz were calculated by LaPlace transform. Amplitudes were related to lung volume. Cumulative percentages of the total amplitude to 96 Hz were similar for males and females at each frequency. Of the total cumulative amplitude to 96 Hz, 50%, 95%, and 99% was contributed by frequencies lower than 12, 52, and 76 HZ, respectively. Amplitudes of rats exceeded those of the system alone between 20 and 40 Hz, due to lung elastic recoil. Thus, systems capable of measuring events of frequencies up to 50 Hz should be adequate for evaluating forced exhalations of rats.

5530 Agriculture And Food Technology

REFER ALSO TO CITATION(S) 48704

48823 (LA-UR—86-1596) Canopy hot-spot as crop identifier. Gerstl, S.A.W.; Simmer, C.; Powers, B.J. (Los Alamos National Lab., NM (USA). Theoretical Div.). May 1986. Contract W-7405-ENG-36. 10p. (CONF-860888—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86011258.

From 12. international conference on very large databases; Kyoto, Japan (25 Aug 1986).

Illuminating any reflective rough or structured surface by a directional light source results in an angular reflectance distribution that shows a narrow peak in the direction of retro-reflection. This is called the Heiligenschein or hot-spot of vegetation canopies and is caused by mutual shading of leaves. The angular intensity distribution of the hot-spot, its brightness and slope, are therefore indicators of the plant's geometry. We propose the use of hot-spot characteristics as crop identifiers in satellite remote sensing because the canopy hot-spot carries information about plant stand architecture that is more distinctive for different plant species than, for instance, their spectral reflectance characteristics. A simple three-dimensional Monte Carlo/ray tracing model and an analytic two-dimensional model are developed to estimate the angular distribution of the hot-spot as a function of the size of the plant leaves. The results show that the brightness-distribution and slope of the hot-spot change distinctively for different leaf sizes indicating a much more peaked maximum for the smaller leaves.

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

REFER ALSO TO CITATION(S) 48829, 48883, 48884, 48887, 48888, 48889, 48890, 48891, 48892, 48893, 48894, 48895

48824 (ANL/EES-TM—308) Weldon Spring historical dose estimate. Meshkov, N.; Benioff, P.; Wang, J.; Yuan, Y. (Argonne National Lab., IL (USA)). Jul 1986. Contract W-31-109-ENG-38. 157p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE86014085.

This study was conducted to determine the estimated radiation doses that individuals in five nearby population groups and the general population in the surrounding area may have received as a consequence of activities at a uranium processing plant in Weldon Spring, Missouri. The study is retrospective and encompasses plant operations (1957-1966), cleanup (1967-1969), and maintenance (1969-1982). The dose estimates for members of the nearby population groups are as follows. Of the three periods considered, the largest doses to the general population in the surrounding area would have occurred during the plant operations period (1957-1966). Dose estimates for the cleanup (1967-1969) and maintenance (1969-1982) periods are negligible in comparison. Based on the monitoring data, if there was a person residing continually in a dwelling 1.2 km (0.75 mi) north of the plant, this person is estimated to have received an average of about 96 mrem/yr (ranging from 50 to 160 mrem/yr) above background during plant operations, whereas the dose to a nearby resident during later years is estimated to have been about 0.4 mrem/yr during cleanup and about 0.2 mrem/yr during the maintenance period. These values may be compared with the background dose in Missouri of 120 mrem/yr.

48825 (CLOR—115/D, pp 21-27) Incorporation of tritiated water from the atmosphere into aqueous and organic components of plants. Indeka, L. (Centralne Lab. Ochrony Radiologicznej, Warsaw, Poland). 1981. NTIS (US Sales Only), PC A15/MF A01. File Number DE86780476.

Published in 1982.

In Biological incorporation of tritium. Final report to the United States Environmental Protection Agency concerning research contract No. 05-536-3.

The incorporation of HTO vapour into the tissue water and organic compartment of five species of plants in various stages of their development was studied. (M.F.W.).

48826 (CLOR—115/D, pp 28-36) Influence of relative humidity of air on the level of aqueous tritium in corn, wheat and sunflower. Indeka, L. (Centralne Lab. Ochrony Radiologicznej, Warsaw, Poland). 1981. NTIS (US Sales Only), PC A15/MF A01. File Number DE86780476.

Published in 1982.

In Biological incorporation of tritium. Final report to the United States Environmental Protection Agency concerning research contract No. 05-536-3.

The short-term changes in level of aqueous tritium in the leaves in relation to the air humidity were studied. The experiments were carried out on corn in which the transpiration is relatively small, on sunflower with very high transpiration and on wheat with intermediate transpiration. (M.F.W.).

48827 (CONF-841187—Vol.2, pp 715) Review of the ICRP document principles of Monitoring for the Radiation Protection of the Population. Meinhold, C.B.; Miltenberger, R.P. (Brookhaven National Lab., Upton, NY). Apr 1985. NTIS, PC A16/MF A01. File Number DE85018026.

From 5. DOE environmental protection information meeting; Albuquerque, NM, USA (6 Nov 1984).

A great deal of confusion exists over the ICRP dose limits for members of the public. This issue, as part of a review of the commissions recommendations on monitoring for the protection of the population, will provide an update for discussions of the concepts and quantities which will be used in international programs in environmental monitoring. This review will cover the relevant recommendations of the commission, modeling and monitoring, objectives and requirements of monitoring programs, monitoring of the source, environment and individuals in the population, and finally the role of quality assurance. A brief review of NCRP basic recommendations in this area will also be presented. The material presented is covered in its entirety in ICRP Publication 39 "Principles for Limiting Exposure of the Public to Natural Sources of Radiation" and ICRC Publication 43, "Principles of Monitoring for the Radiation Protection of the Population."

48828 (DOE/ER/60393—1) Mutagenic effect of radionuclides incorporated into DNA of Drosophila melanogaster. Technical progress report, December 15, 1985-July 15, 1986. Lee, W.R. (Louisiana State Univ., Baton Rouge (USA). Dept. of Zoology and Physiology). 1986. Contract FG05-86ER60393. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014680.

This project compares the mutagenic effect of ionizing radiation from tritium to that of x-ray. Mutants are described at the molecular level after having been characterized by classical genetic techniques in Drosophila melanogaster, therefore tying together the molecular studies with previous work in mutagenesis. The objectives of this project are to analyze x-ray and tritium induced mutants by "walking down" the chromosomes and studying the frequency of breaks that are not associated with the gene used in screening for the mutants, to study the molecular effect of these mutants in heterozygotes with the aim of developing methods of detecting mutants in heterozygotes that may be applicable to human populations, and to induce mutants from tritium beta radiation and analyze them at the molecular level. 9 refs., 4 figs.

48829 **(DOE/ER/60402—1) Radiation physics, biophysics, and radiation biology. Progress report, December 1, 1985-November 30, 1986.** Hall, E.J. (Columbia Univ., New York (USA). Radiological Research Lab.). Jul 1986. Contract FG02-86ER60402. 85p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86013991.

This is the annual report of the Radiological Research Laboratory of the Department of Radiation Oncology, Columbia University. The bulk of the research of the Laboratory involves basic and fundamental aims, not confined to radiotherapy. Research carried out in the Laboratory covers the determination of microdosimetry quantities, computer simulation of particle tracks, determination of oncogenic transformation, and the transfection of DNA into cells. The Hallmark of the Laboratory is the interaction between physics and biology.

48830 **(DOE/EV/10417—1) Immunochemical approach to the study of DNA damage and repair. Technical progress report.** (New York Medical Coll., NY (USA)). 1986. Contract AC02-80EV10417. 82p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014813.

We are studying damages that have been shown to be stable radiolysis products found in x-irradiation DNA and thus products that have potential biological consequences. Four thymine ring saturation or fragmentation products were chosen as models for pyrimidine radiolysis products. The first product we synthesized and to which antibodies were elicited was thymine glycol. Thymine glycols are the major stable radiolysis products produced in DNA x-radiation in vitro. Although they retain base pairing characteristics, the stacking properties of thymine glycols are altered due to the saturation of the 5.6 double bond. Thymine glucol is also a useful model because alternative assay proceudres are available and they can selectively be produced in DNA by osmium tetroxide oxidation allowing the development of standards for subsequent measurement of DNA damage in x-irradiated DNA. We have also raised antibodies to dihydrothymine, a major radiolysis product produced in NDA under anaerobic conditions, to 5-hydroxy-5-methylhydantoin, the second most predominant stable radiolysis product productded under aerobic conditions, and to urea, a totally non-instructive DNA fragmentation product of thymine hydroperoxides. 29 refs., 2 figs.

48831 **(GSF—6/85) Radiation doses resulting from incorporated radioactive cesium isotopes.** Henrichs, K.; Paretzke, H.G. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz). Apr 1985. 45p. (In German). (GSF-S—1221). NTIS (US Sales Only), PC A03/MF A01. File Number DE86752604.

Age-dependent dose factors are given for inhaled or ingested cesium isotopes, which have been calculated on the basis of published data on the biokinetics of cesium in the human organism. Tabulated data are presented for Cs-129, Cs-130, Cs-131, Cs-132, Cs-134, Cs-135, Cs-136, Cs-137(+Ba-137m), and Cs-138. Comparison of results obtained for adults with relevant data published by the ICRP (1978), the NCRP (1977), and Schwarz (1982) shows very good agreement. More significant deviations are however found when comparing the results with data given in the Federal German Radiation Protection Ordinance, both with regard to adults and to infants, particularly refering to the lung data and to those for the gastro-intestinal tract and the skeleton. These discrepancies are primarily due to improved models developed since the time the Radiation Protection Ordinance has been issued, (respiratory and gastro-intestinal tracts), and to improvements achieved with the dosimetric concepts (calculation of dose for bone surfaces instead of the whole skeleton). The dose factors for newborn given by the publication in hand are significantly lower than those given in the Ordinance (for infants); this is a result of age-dependent retention functions having been considered for this publication. The reliability of the dose factor calculations for various ages, pregnant women and fetuses is discussed and quantified.

48832 **(GSF—7/85) Dose factors for contamination of skin and clothing.** Henrichs, K.; Eiberweiser, C.; Paretzke, H.G. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz). Nov 1985. 112p. (In German). (GSF-S—1285). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752608.

Methods are described for quantifying the radiation dose administered through radioactive contamination of the skin (and of clothing, in an approximative manner). The calculated results are presented in tables. The dose values established are of significance with regard to radiological assessment of contamination for the definition of dose limits, and for use as a criterion to select appropriate decontamination activities. Alpha, beta and monoenergetic electrons are of importance for estimating the absorbed dose in various skin depths, whereas for other body regions (as e.g. body organs) photon radiation has to be considered. The calculations are based on the assumption of homogeneous exposure of the skin, with the linear extension being large compared to the range of the emitted particle radiation. In order to be able to take into account potential penetration of radioactivity into deeper skin layers by diffusion or solution processes, the calculations have been made for contamination into various depths of the horny layers of the epidermis. The scheme of specific absorbed fraction (SAF) served as a basis for the uniform treatment of different radiation types for the calculation of dose values.

48833 **(HEHF—54-85) United States Transuranium Registry annual report, October 1, 1984-September 30, 1985.** Swint, M.J.; Kathren, R.L. (Hanford Environmental Health Foundation, Richland, WA (USA)). Apr 1986. Contract AC06-65RL01837. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014793.

A one day meeting was held in Richland with the USTR-USUR Advisory Committee to review the preceding year's activities and to outline and seek advice for the coming year's studies. The update on the whole body calibration phantoms, bone ash actinide relationship, as well as the preliminary results of bone marrow studies were presented. The projected analytical laboratory intercomparison study, as well as studies to be done in collaboration with Argonne National Laboratory and the further evaluation of partial body autopsy results, were discussed with the Committee. The Committee's observations and recommendations were received and included in the formal report. 8 refs., 3 tabs.

48834 **(INIS-mf—10144) Proceedings of microdosimetry seminar.** Fueloep, M. (ed.). (Vyskumny Ustav Preventivneho Lekarstva, Bratislava (Czechoslovakia)). 1983. 101p. (In Czech and Slovak). (CONF-8303222—). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161.

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

Participants in the seminar heard eight papers oriented to the problems of the effects of ionizing radiations on biological tissues. The basic terms of microdosimetry are explained and the prospective uses discussed of microdosimetry in radiobiology. The biological effects are described of ionizing particles and the proximity function is described for the study of the radiobiological effect. The use is described of alpha radiation microdosimetry in distinguishing the effect of inactivation from malignant cell transformation. The method is presented of calculating the deposition of energy in spherical volumes and the determination of microdosimetric variables using a tissue-equivalent spherical proportional detector. The use of a detector of the same type is described for the determination of the quality factor of neutron-gamma fields of neutron sources. (E.S.).

48835 (INIS-mf—10144, pp 3-19) **Basic terms of microdosimetry.** Fueloep, M. (Vyskumny Ustav Preventivneho Lekarstva, Bratislava, Czechoslovakia). 1983. (In Slovak). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

Microdosimetry is concerned with the fluctuations of energy transmitted to sensitive microstructures and the analysis of corresponding spatial distributions of energy deposition. The used variables and units are given and methods are described which are used to determine microdosimetric characteristics. Experimental methods require the use of sensitive equipment for detecting low energies. Proportional counters and cloud chambers are used. They are briefly described. Analytical methods based on approximations and the Monte Carlo method are used for the calculation of dosimetric characteristics. Formulas are given for calculating linear energy transfer and for determining the components of absorbed dose of mixed radiation and the relative biological effectiveness. (J.P.).

48836 (INIS-mf—10144, pp 20-27) **Prospects of applying microdosimetry in radiobiology.** Salava, J. (Vyskumny Ustav Preventivneho Lekarstva, Bratislava, Czechoslovakia). 1983. (In Slovak). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

A study of the biological effects of radiation cannot do without biophysical models of the mechanism of damage to living structures. These models must be microdosimetric, i.e., must respect the random character of the interaction of radiation at cellular and subcellular levels. The model is discussed of the biological effects of radiation with regard to the inactivation of cells based on the hit theory which culminates in the theory of dual radiation action. The question is discussed of which sensitive structure is damaged by ionizing radiation. The hitherto used models do not quantify biological repair; only models based on the biological modification of primary damage attempt to describe the repair of double-strand breaks of DNA. The contribution is emphasized of microdosimetry which, with the help of models of biological radiation effects, may contribute to establish better values of the quality factor of radiation. (J.P.).

48837 (INIS-mf—10144, pp 28-40) **Microdosimetric characteristics and biological effect of ionizing particles.** Lokajicek, M. (Ceskoslovenska Akademie Ved, Prague. Fyzikalni Ustav). 1983. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

The inactivation of haploid cells following radiation damage, the number of double-strand breaks and the inactivation of diploid cells, the theory of the dual effect and the non-Poisson distribution of double-strand breaks, the dependence of the mean number of double-strand breaks on the applied dose and the distribution of double-strand breaks effected by one ionizing particle are discussed for clarifying the inactivation mechanism. (J.P.).

48838 (INIS-mf—10144, pp 41-49) **Significance of proximity function for radiobiological effect study.** Pridal, I. (Karlova Univ., Prague, Czechoslovakia. Fakulta Matematicko-Fyzikalni). 1983. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

The possibilities are explained of describing spatial correlations of energy transfer in the track of an ionizing particle using the t-function together with some methods of determining this microdosimetric variable. Also indicated is the significance of the t-function in the theory of the dual action and the possibilities are assessed of using the proximity function in the description of the effect of radiation type on cell inactivation.

48839 (INIS-mf—10144, pp 50-64) **Use of alpha radiation microdosimetry in differentiating between the effects of cell inactivation and malignant transformation.** Sedlak, A. (Institut Hygieny a Epidemiologie, Prague, Czechoslovakia). 1983. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

Densely ionizing radiation which induces malignant transformations damages the cells only sublethally. In order to explain this paradox the threshold specific energy z_0 was introduced independent of LET, deposited in the cell nucleus. Exceedance of value z_0 would lead to the inactivation of cells. The distribution function F(z,D) is derived expressing the probability with which any value of specific energy less than or equal to z is achieved at dose D. The function is dependent on the size of the target and the quality of radiation. The possibility is discussed of inducing a malignant tumor in the cell by the direct effect of alpha radiation, and its explanation by introducing threshold energy z_0 which would mean that not every sublethal lesion must induce malignant cell transformation. (J.P.).

48840 (INIS-mf—10144, pp 65-76) **Calculation of energy deposition in spherical volumes.** Gavor, J. (Ceske Vysoke Uceni Technicke, Prague, Czechoslovakia. Fakulta Jaderna a Fysikalne Inzenyrska). 1983. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

The distribution of particle track lengths is related to particles which penetrate into the said volume from the surrounding medium and particles which originate inside the considered volume. Relations are given for probable track lengths. Particles which cause individual ionizing events are divided according to the beginning and end of their track in the cavity into internal, beginning, ending and passing. Relations are given for the frequency distribution of energy of these particles as are relations for the frequency and dose distributions of linear energy. On the basis of the said analysis a programme has been written for the calculation of microdosimetric parameters for a spherical cavity whose content consists of the biogenic elements H, C, N, and O. The calculated contributions of the said particles are presented in figures and related to the frequency distribution of linear energy. It was found that for a cavity of a diameter of 1 μm in soft tissue and irradiated with neutrons from a ^{252}Cf source, passing particles comprise 92.8%. The share of ending and beginning particles is roughly eqUal. Under the same irradiation conditions with an enlargement of the cavity diameter to 3 μm, passing particles make up 81.5% and internal particles 3.6%. In case of irradiation with 0.1 MeV neutrons and a cavxty diameter of 1 μm, beginning particles make up the biggest proportion of 35.7% and passing particles take the smallest share of 12.4%. In the frequency distribution of internal particles, discontinuities have appeared corresponding to oxygen and carbon ions. (E.S.).

48841 (INIS-mf—10144, pp 77-89) **Determination of microdosimetric quantities using a proportional detector.** Podzimek, F. (Vojensky Lekarsky Vyzkumny a Doskolovaci Ustav J.E. Purkyne, Hradec Kralove, Czechoslovakia). 1983. (In Czech). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

The relations are given for calculating the dose distribution of linear energy from the measured frequency distribution of transmitted energy and for calculating the LET dose distribution. The microdosimetric deposition of energy was measured using a commercial tissue-equivalent spherical proportional detector. The signal from the detector was fed into a charge-sensitive preamplifier and from there through a linear amplifier into a Canberra multi-channel analyzer. The whole spectrum was tape recorded and mathematically processed using an HP-85 pocket calculator. Energy calibration was made of the measuring instrument. A ^{244}Cm source was used for gamma calibration. The so-called proton edge of a Pu-Be source was used for neutron energy calibration. The described

equipment was used for measuring ^{253}Cf and Pu-Be neutron sources. The table compares mean values of linear energy and LET for frequency and dose distribution. The figures present the frequency distribution of transmitted energy for the individual neutron sources and the differential distribution of standardized dose distribution of linear energy or LET. For ^{253}Cf, a comparison is made with the theoretically computed distribution for a detector with walls of tissue-equivalent plastic. (E.S.).

48842 (INIS-mf—10144, pp 90-98) **Determination of the quality factor of mixed neutron-gamma fields using a proportional counter.** Fueloep, M. (Vyskumny Ustav Preventivneho Lekarstva, Bratislava, Czechoslovakia). 1983. (In Slovak). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703161. (CONF-8303222—).

From Microdosimetry seminar; Bratislava, Czechoslovakia (22 Mar 1983).

A proportional counter was built with a suppressed wall effect; the inner cavity diameter was 130 mm and the diameter of the sensitive volume 12.5 mm. The walls were of polyethylene, the tissue-equivalent content consisted of a mixture of methane, CO_2 and N_2. The diameter of the microvolume was modelled at 2 μm. With regard to the dosimetric approach for determining the quality factor of mixed neutron-gamma radiation, Am-Be and Pu-Be neutron sources were chosen. Linear energy spectra were measured in three irradiation geometries: unshielded Am-Be and Pu-Be, Am-Be shielded with a 2.5 cm layer of Pb, and Pu-Be moderated by a polyethylene sphere of a diameter of 19.5 cm. The quality factor of unshielded Am-Be was lower than that of shielded Pu-Be. Shielding the Am-Be source increased the quality factor from 2.97 to 7.35. Placing the Pu-Be source in the moderation sphere reduced the quality factor from 7.03 to 4.36. The decrease is caused by the trapping of neutrons by hydrogen nuclei. (E.S.).

48843 (INIS-mf—10172) **Second national congress on medical biology and genetics with international participation. Abstracts of reports from the plenary meeting.** (Syyuz na Nauchnite Rabotnitsi v Bylgariya, Sofia; Syyuz na Nauchnite Meditsinski Druzhestva v Bylgariya, Sofia. Druzhestvo po Khigiena; Republikansko Nauchno-Meditsinsko Druzhestvo po Meditsinska Biologiya i Genetika, Sofia (Bulgaria); Meditsinska Akademiya, Sofia (Bulgaria). Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. 115p. (In Bulgarian). (CONF-8506289—Absts.). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481.

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

Individual papers are processed separately for appropriate data bases.

48844 (INIS-mf—10172, pp 94) **Cytogenetic and hormonal studies during irradiation.** Ivanov, B.; Milanov, S.; Bulanova, M.; Mileva, M. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48845 (INIS-mf—10172, pp 96) **Chromosome aberrations kinetics in mouse bone marrow cells and embryos after irradiation and cyclophosphamide treatment.** Rupova, I.; Popova, M.; Benova, D. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48846 (INIS-mf—10172, pp 98) **Antimutagenic effect of WR 2721 in X-ray induced reciprocal translocations in mouse spermatogonia.** Benova, D. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48847 (INIS-mf—10172, pp 99) **Studies on the antimutagenic effects of MEA and AET in mice.** Bajrakova, A. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48848 (INIS-mf—10172, pp 91) **Chromosome aberrations in human somatic cells after irradiation and possible relationships to the late radiation injuries.** Bulanova, M.; Benova, D.; Filev, G. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48849 (INIS-mf—10172, pp 93) **Evaluation of the genetic risks from radiation in human.** Vyglenov, A.; Baev, I. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48850 (INIS-mf—10172, pp 97) **Study of the influence of incorporated cerium 144 on the genetic structures of rat bone marrow cells.** Georgieva, I.; Mileva, M.; Bulanova, M.; Paskalev, Z. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48851 (INIS-mf—10172, pp 97) **Reciprocal translocations in the germ cells of male mice after one-way inocculation of tritiated water.** Yagova, A.; Bajrakova, A. (Meditsinska Akademiya, Sofia, Bulgaria. Nauchen Inst. po Rentgenologiya i Radiobiologiya). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48852 (INIS-mf—10172, pp 98) **Chromosome aberrations induced by H-3-thymidine and H-3-uridine in Rana ridibunda L. .** Belcheva, R.; Martinova, J.; Atanasova-Krysteva, M.; Ilieva, Kh. (Sofia Univ., Bulgaria. Biologicheski Fakultet; Bylgarska Akademiya na Naukite, Sofia). Jun 1985. (In Bulgarian). NTIS (US Sales Only), PC A06/MF A01. File Number DE86780481. (CONF-8506289—Absts.).

From 2. national congress on medical biology and genetics with international participation; Sofia, Bulgaria (8 Jun 1985).

48853 (INIS-mf—10174, pp XVIII/112) **Experiences from laboratory of internal contamination measurement in Nuclear Research Institute, Rez near Praque.** Vejnar, J.; Neuzil, J. 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48854 (INIS-mf—10174, pp vp) **Concentrations of ^{222}Rn and its short-lived decay products in a number of Greek radon spas.** Kritidis, P.; Angelov, P. (National Research Foundation, Athens, Greece). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48855 **(INIS-mf—10183) Comparative studies on the proliferation and differentiation of granulocytic progenitor cells CFU-C from the blood and bone marrow of dogs under normal conditions and after 80 R whole-body irradiation.** Faul, H. (Ulm Univ. (Germany, F.R.). Fakultaet fuer Theoretische Medizin). 4 May 1984. 87p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE86752586.

The study was performed on dogs of both sexes and dealt with two complex issues: 1) the identity of the granulocytic progenitor cell CFU-C in the blood and bone marrow, and 2) possible verification of damage to stem cell store using the granulocytic progenitor cell CFU-C as an indicator for damage caused, in this case, by 80 rd whole body irradiation of dogs. A special culture technique was developed to study these issues, and was tested for its functionability. Examinations of the dogs with whole-body irradiation revealed the following results: a) Radiation damage to the stem cell store could be verified by the study object of CFU-C granulocytic progenitor cell of the bone marrow. A reduction of proliferative capacity linked with a change in the differentiation profiles for the different cell types in the suspension cultures was clearly verified. b) The suspension culture technique allows to verify damage by ionizing radiation both in the acute phase, i.c. two hours after irradiation, and in the late recovery phase.

48856 **(INIS-mf—10195) Therapeutic tests on methylcholanthrene-induced fibrosarcoma and transplanted fibrosarcoma of the mouse - clostridial oncolysis and its enhancement by high-frequency hyperthermia and X-rays.** Pirlet, T. (Frankfurt Univ. (Germany, F.R.). Fachbereich Humanmedizin). 4 Oct 1982. 359p. (In German). NTIS (US Sales Only), PC A16/MF A01. File Number DE86752592.

Tests aimed at a conditioning of tumours by means of x-ray irradiation and high-frequency hyperthermia. Methyl cholanthrene-induced fibrosarcoma (IMCM) and its transplant version (T-IMCM) produced at the neck of NMRI-mice at a critical localization immediately next to vital organs, served as a test system since it is almost resistant to simple oncolysis. Individual therapy components were compared for their mutual enhancement of efficacy in 16 test groups, and the triple combination (Cl + X-ray + HFH) was tested in relapse application as well. A 2000-R x-ray irradiation was followed by almost simultaneous 4 min HF heating and i.v. spore administration at 12 h intervals. Assessment criteria were tumour growth, survival rates and times, absence of recidivity and healing, analysis of post-mortem findings and dimension or duration of lyses. In addition, the two tumour types of induction and transplant tumour were compared. The typical course of clostridial oncolysis can be confirmed in principle. Results show that it is possible by means of additional physical methods as were applied, to increase the systemically apathogenic and selective therapy principle of rather neglible oncolysis to over 80% (IMCM) or 97% (T-IMCM). Concerning the MCA fibrosarcoma which is very resistant to clostridial oncolysis in this mouse-tumour model, marked prolongations of survival or healing are possible even in extremely critical localization. In principle, this provides the preconditions for including oncolysis in clinical studies in human medicine.

48857 **(INIS-mf—10402) 10th AINSE radiation biology conference, 22-23 August 1985, Lucas Heights - AINSE Theatre. Conference handbook.** (Australian Inst. of Nuclear Science and Engineering, Lucas Heights; Vermont Univ., Burlington (USA). Coll. of Medicine). Aug 1985. 55p. (CONF-8508179—). NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480.

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

Individual papers are processed separately for appropriate data bases.

48858 (INIS-mf—10402, pp 7) **Assays for human genotoxicity monitoring: in vivo dosimeters versus surrogate markers for genotoxic disease.** Albertini, R.J.; Green, C.J. (Vermont Univ., Burlington, USA. Coll. of Medicine). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48859 (INIS-mf—10402, pp 12) **Mechanisms of radiation-induced mutational damage in eukaryotes.** Abrahamson, S. (Wisconsin Univ., Madison, USA. Dept. of Zoology). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48860 (INIS-mf—10402, pp 14) **Role of free radicals in the development of radiation injury.** Gebicki, J.M. (Macquarie Univ., North Ryde, Australia. School of Biological Sciences). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48861 (INIS-mf—10402, pp 16) **Evolutionary rates under environmental stress.** Parsons, P.A. (La Trobe Univ., Bundoora, Australia. Dept. of Genetics). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48862 (INIS-mf—10402, pp 17) **Chromatin structure in ataxia-telangiectasia.** Stacey, K.; Houldsworth, J.; Lavin, M.F. (Queensland Univ., St. Lucia, Australia. Dept. of Biochemistry). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48863 (INIS-mf—10402, pp 18) **Cell cycle and ataxia telangiectasia.** Bates, P.R.; Imray, F.P.; Chen, P.M.F.; Lavin, M.F. (Queensland Univ., St. Lucia, Australia. Dept. of Biochemistry). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48864 (INIS-mf—10402, pp 21) **Radiosensitivity in Down syndrome.** Chen, P.; Kidson, C. (Queensland Inst. of Medical Research, Brisbane, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48865 (INIS-mf—10402, pp 22) **Evidence for a general relationship between the induced level of DNA double-strand breakage and mammalian cell killing after x-irradiation.** Radford, I.R. (Cancer Inst., Melbourne, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48866 (INIS-mf—10402, pp 23) **Southern blotting analysis of mutations induced at the HPRT locus in CHO cells by x-rays and ^{125}I Iododeoxyuridine.** Gibbs, R.A.; Martin, R.F.; Camakaris, J.; Hodgson, G.S. (Cancer Inst., Melbourne, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48867 (INIS-mf—10402, pp 24) **Alpha-polymerase inhibition, cysteine concentrations and chromosome aberrations in x-irradiated G_2 cells.** Moore, R.C.; Randell, C. (Cancer Inst., Melbourne, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48868 (INIS-mf—10402, pp 25) **Effect of physiological concentrations of cysteine on x-ray induced DNA damage in cultured cells.** Randell, C.; Roos, I. (Cancer Inst., Melbourne, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48869 (INIS-mf—10402, pp 27) **Thermal neutron radiosensitivity of human leukaemia and bone marrow cell lines.** Allen, B.J.; Linklater, H.; Bradstock, K.F.; Sabaloro, E. (Australian Atomic Energy Commission Research Establishment, Lucas Heights. Applied Physics Div.; Institute of Clinical Pathology and Medical Research, Westmead Centre, Sydney, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48870 (INIS-mf—10402, pp 28) **In vitro neutron capture therapy study of human melanoma cell lines using enriched B-10 boronophenyl-alanine.** Allen, B.J.; Linklater, H.; Brown, J.K.; Mountford, M.H.; Parsons, P.G.; Mishima, Y. (Australian Atomic Energy Commission Research Establishment, Lucas Heights; Queensland Inst. of Medical Research, Brisbane, Australia; Kobe Univ., Japan. School of Medicine). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48871 (INIS-mf—10402, pp 30) **Chromosomal radiosensitivity of tadpoles of limnodynastes tasmaniensis.** Brown, J.K.; Chapman, J.E. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48872 (INIS-mf—10402, pp 33) **Mutation and radiation resistance in dictyostelium discoideum.** Williams, K.L.; Welker, D.L. (Macquarie Univ., North Ryde, Australia. School of Biological Sciences; Utah Univ., Salt Lake City, USA. Dept. of Biological Sciences). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48873 (INIS-mf—10402, pp 35) **Effect of gamma radiation on transcription in ataxia-telangiectasia lymphoblastoid cells.** Kumar, S.; Lavin, M.F. (Queensland Univ., St. Lucia, Australia. Dept. of Biochemistry). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48874 (INIS-mf—10402, pp 39) **Radiation-induced chromosome damaged G_2 cells.** Lavelle, A.L.; Moore, R.C.; Martin, R.F. (Monash Univ., Clayton, Australia. Dept. of Genetics; Cancer Inst., Melbourne, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48875 (INIS-mf—10402, pp 41) **Frameshift mutagenesis in S. typhimurium.** Ritchie, L. (Commonwealth Scientific and Industrial Research Organization, North Ryde, Australia. Div. of Molecular Biology). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48876 (INIS-mf—10402, pp 20) **Radiation effects in the frog limnodynastes tasmaniensis.** Panter, H.C. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48877 (INIS-mf—10402, pp 32) **Role of frogs in radiation biology.** Tyler, M.J. (Adelaide Univ., Australia. Dept of Zoology). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48878 (INIS-mf—10402, pp 34) **UV-induced skin cancers.** Parsons, P.G. (Queensland Inst. of Medical Research, Brisbane, Australia). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48879 (INIS-mf—10402, pp 31) **SNIF - the standard neutron irradiation facility at Lucas Heights.** Boldeman, J.W.; Cohen, D.D.; Katsaros, A.; Lavin, M.F. (Australian Atomic Energy Commission Research Establishment, Lucas Heights; Australian Inst. of Nuclear Science and Engineering, Lucas Heights; Queensland Univ., St. Lucia, Australia. Dept. of Biochemistry). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

48880 **(NVO—232-Rev.3) Radiation safety manual for the Nevada Test Site. Revision 3.** (Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV (USA); USDOE Nevada Operations Office, Las Vegas). Jun 1986. Contract AC08-76NV00410. 304p. NTIS, PC A14/MF A01; 1; GPO Dep. File Number DE86014101.

This report defines minimum radiation protection standards for test site personnel and DOE/NV contractor personnel offsite. It establishes, under Department of Energy policy, responsibilities for radiological safety for NTS operations as functional assignments, and guidelines for radiation protection standards, personnel dosimetry and monitoring, area control, protective equipment and safety

requirements, radioactive material control, transfer and shipment, citing requirements and codes, and standards of pertinent federal agencies.

48881 (OEFZS-A—0686, pp 38) **DNA metabolism of spleen cells of mice after HeNe laser irradiation.** Topaloglou, A.; Pinterits, G.; Altmann, H.; Barabas, K.; Dunky, A. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie; Orszagos Reuma- es Fizioterapias Intezet, Budapest, Hungary. Koezponti Izotoplaboratorium; Krankenhaus der Stadt Wien-Lainz, Austria. 2. Medizinische Abt.). Jun 1985. (In German). Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-8506290—Absts.; BL—508/85).

From International symposium on drug therapy and alternative therapy methods; Sopron, Hungary (21 Jun 1985).

48882 (OEFZS-A—0756, pp 1) **Poly (ADP-ribose) present at the replication origin of DNA.** Altmann, H.; Topaloglou, A.; Brkic, G. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie; Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48883 (OEFZS-A—0756, pp 4) **Time dependence of biochemical parameters during induction of DNA repair.** Vincze, I.; Gueth, L.; Karcagi, V.; Puespoeky, J.; Weniger, P.; Altmann, H. (National Institute of Hygiene, Budapest, Hungary. Dept. of Biochemistry; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48884 (OEFZS-A—0756, pp 6) **Influence of radiation and 3-methoxybenzamide on DNA rejoining.** Bhatia, A.L. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48885 (OEFZS-A—0756, pp 7) **Simultaneous determination of mono- and poly(ADP-ribose) in vivo by tritium labelling and direct HPLC separation.** Hakam, A.; McLick, J.; Kun, E. (California Univ., San Francisco, USA. Cardiovascular Research Inst.). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48886 (OEFZS-A—0756, pp 8) **Hormonal imprinting and poly(ADP-ribose)-synthesis.** Toeroek, O.; Csaba, G.; Altmann, H. (Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48887 (OEFZS-A—0756, pp 9) **Poly(ADP-ribose)-synthesis and DNA metabolism in lymphocytes of hypertension patients.** Varga, L.; Simon, E.; Domjan, G.; Topaloglou, A.; Phoung, P.T.; Altmann, H. (Staatliches Sanatorium, Sopron, Hungary; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. (In German). Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48888 (OEFZS-A—0756, pp 10) **Lymphocytic subsets of C57Bl mice after whole body irradiation and application of par-polymerase modifying factors.** Tuschl, H.; Kovac, R. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48889 (OEFZS-A—0756, pp 11) **Modification of mutagenesis and repair processes by human interferons.** Zasukhina, G. (Akademiya Meditsinskikh Nauk SSSR, Moscow. Inst. Meditsinskoj Genetiki). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48890 (OEFZS-A—0756, pp 12-13) **Inhibition of lymphocyte activation by serum lipoproteins: effect of VLDL and LDL.** Somogyi, J.; Koevecses, M.; Szollar, L.; Szamel, M. (Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48891 (OEFZS-A—0756, pp 15-16) **Effect of free radical scavengers on lymphocyte blast transformation.** Feher, J.; Vallent, K.; Lang, I.; Gonzales-Cabello, R.; Gergely, P.; Varga, L. (Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary; Staatliches Sanatorium, Sopron, Hungary). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48892 (OEFZS-A—0756, pp 18) **Appearance of methylguanine in the DNA of CHO-cells before and after methylnitrosourea therapy.** Kutscher, R. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. (In German). Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48893 (OEFZS-A—0756, pp 20-22) **Metabolism of RNA primer in replicative DNA synthesis.** Banfalvi, G.; Antoni, F.; Sarkar, N. (Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary; Boston Biomedical Research Inst., MA, USA; Harvard Medical School, Boston, MA, USA). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48894 (OEFZS-A—0756, pp 26-27) **Formation of covalent DNA adducts in activated drug metabolizing systems.** Schoket, B.; Vincze, I.; Weniger, P.; Altmann, H. (National Institute of Hygiene, Budapest, Hungary. Dept. of Biochemistry; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48895 (OEFZS-A—0756, pp 33) **Trace elements and excision repair in light sensitive skin diseases.** Horkay, I.; Kosa, A.; Nagy, E.; Altmann, H.; Teherani, D.K. (University Medical School, Debrecen, Hungary. Dept. of Dermatology; Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Biologie). Dec 1985. Institute for Biology, OEFZS, A-2444, Seibersdorf, Austria. (CONF-851281—Absts.; BL—538/852).

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

48896 **(OEFZS-A—0756) DNA metabolism influencing factors.** (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Nov 1985. 34p. (In German and English). (CONF-851281—Absts.; BL—538/852). Institute for Biology, OEFZS, A-2444 Seibersdorf, Austria.

From DNA metabolism influencing factors; Vienna, Austria (5 Dec 1985).

This report is a collection of abstracts of presentations held at the Symposium 'DNA metabolism influencing factors'. Some of these abstracts are within the subject scope of INIS and these abstracts are treated separately for INIS. A publication of proceedings of this conference is planned for the end of 1986.

48897 **(PNL-SA—13454) Two example applications of optimization techniques to US Department of Energy contractor radiation protection programs.** Merwin, S.E.; Martin, J.B.; Selby, J.M.; Vallario, E.J. (Pacific Northwest Lab., Richland, WA (USA)). Jan 1986. Contract AC06-76RL01830. 15p. (CONF-860315—1; IAEA-SM—285/21). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013340.

From International symposium on the optimization of radiation protection; Vienna, Austria (10 Mar 1986).

Six numerical examples of optimization of radiation protection are provided in the appendices of ICRP Publication 37. In each case, the calculations are based on fairly well defined parameters and assumptions that were well understood. In this paper, we have examined two numerical examples that are based on empirical data and less certain assumptions. These examples may represent typical applications of optimization principles to the evaluation of specific elements of a radiation protection program. In the first example, the optimum bioassay frequency for tritium workers was found to be once every 95 days, which compared well with ICRP Publication 10 recommendations. However, this result depended heavily on the assumption that the value of a potential undetected rem was US $1000. The second example showed that the optimum frequency for recalibrating Cutie Pie (CP) type ionization chamber survey instruments was once every 102 days, which compared well with the Hanford standard frequency of once every 90 days. This result depended largely on the assumption that an improperly operating CP instrument could lead to a serious overexposure. These examples have led us to conclude that optimization of radiation protection programs must be a very dynamic process. Examples must be recalculated as empirical data expand and improve and as the uncertainties surrounding assumptions are reduced.

5602 Thermal Effects

REFER ALSO TO CITATION(S) 47642

48898 **(CONF-8508192—1) Basic concepts in freezing cells.** Mazur, P. (Oak Ridge National Lab., TN (USA)). 1985. Contract AC05-84OR21400. 22p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014216.

From 1. international conference on deep freezing of boar semen; Uppsala, Sweden (25 Aug 1985).

Freezing involves the lowering of temperature and the formation of ice. Most cells have not been found to be sensitive to the former; rather injury is a consequence of the removal of water from the system in the form of ice. Some cells such as boar sperm and those of many tropical crops are susceptible to even short-term lowering of temperature to near O°C. This susceptiblity, which is independent of the rate of temperature drop, is defined as chilling injury. Other cells are injured by chilling only if the rate of cooling is high, a phenomenon referred to as thermal shock. This paper discusses the physical-chemical events during freezing and on freezing injury will assume that lowered temperature per se is not injurious.

5603 Chemicals Metabolism And Toxicology

REFER ALSO TO CITATION(S) 47171, 47210, 48056, 48060

48899 **(BNL—38355) Correlation of trace elements in hair with colon cancer.** Kwiatek, W.M.; Cholewa, M.; Kajfosz, J.; Jones, K.W.; Shore, R.E.; Redrick, A.L. (Brookhaven National Lab., Upton, NY (USA); New York Univ., NY (USA). Medical Center). 1986. Contract AC02-76CH00016. 21p. (CONF-8606181—4). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014172.

From 4. international conference on particle induced X-ray emission and its analytical applications; Tallahassee, FL, USA (9 Jun 1986).

The trace element content of 116 hair samples from patients with colon cancer and from referent series of patients who had a variety of other diseases were measured using proton-induced x-ray emission (PIXE). The patients had been on largely uncontrolled diets, and the interest was whether there were differences in trace element concentrations attributable to the effects of colon cancer. The concentrations of K, Ca, Mn, Fe, Cu, Zn, Se, Br, and Rb were determined using a beam of 2.5-MeV protons. Minimum detectable limits (MDL) of 0.3 ppM were obtained for Zn and Se. Cluster analysis of the data set did not reveal any significant differences between the cancer and control groups. Mean values and ranges obtained for the elemental concentrations show good agreement with other published determinations. 20 refs., 3 figs., 3 tabs.

48900 **(BNL—38357) Elemental concentrations in bones from an ancient Egyptian mummy and from a recent man.** Cholewa, M.; Kwiatek, W.M.; Jones, K.W.; Schidlovsky, G.; Paschoa, A.S.; Miller, S.C.; Pecotte, J. (Brookhaven National Lab., Upton, NY (USA); Utah Univ., Salt Lake City (USA)). Jun 1986. Contract AC02-76CH00016. 12p. (CONF-8606181—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014127.

From 4. international conference on particle induced X-ray emission and its analytical applications; Tallahassee, FL, USA (9 Jun 1986).

Differences in elemental concentrations in bones taken from an ancient Egyptian mummy and a contemporary man were investigated by using proton induced x-ray emission (PIXE) in combination with Rutherford backscattering (RBS). Remarkable differences were noticed in the Fe/Ca and Pb/Ca relative concentrations, which were consistently higher in the contemporary man. 5 refs., 2 figs., 2 tabs.

48901 **(BNL—38373) In vivo monitoring of toxic metals: assessment of neutron activation and x-ray fluorescence techniques.** Ellis, K.J. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 23p. (CONF-8606152—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014129.

From 17. international Rochester conference; Rochester, NY, USA (2 Jun 1986).

To date, cadmium, lead, aluminum, and mercury have been measured in vivo in humans. The possibilities of monitoring other toxic metals have also been demonstrated, but no human studies have been performed. Neutron activation analysis appears to be most suitable for Cd and Al measurements, while x-ray fluorescence is ideally suited for measurement of lead in superficial bone. Filtered neutron beams and polarized x-ray sources are being developed which will improve in vivo detection limits. Even so, several of the current facilities are already suitable for use in epidemiological studies of selected populations with suspected long-term low-level "environmental" exposures. Evaluation and diagnosis of patients presenting with general clinical symptoms attributable to possible toxic metal exposure may be assisted by in vivo examination. Continued in vivo monitoring of industrial workers, especially follow-up measurements, will provide the first direct assessment of changes in body burden and a direct measure of the biological lifetimes of these metals in humans. 50 refs., 4 figs., 2 tabs.

48902 (BNL—38374) Logistic regression analysis of cadmium-induced renal abnormalities. Ellis, K.J.; Yuen, K.; Cohn, S.H. (Brookhaven National Lab., Upton, NY (USA)). Feb 1986. Contract AC02-76CH00016. 20p. (CONF-860297—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014174.

From 5. international cadmium conference; San Francisco, CA, USA (1 Feb 1986).

Cases of renal dysfunction associated with cadium exposure have been reported in Belgium, Great Britian, Japan, United States, and Sweden. Indirect estimates of body burden were often based on the measurement of environmental exposure conditions or on tissue concentrations in urine, blood, saliva, or hair clippings. More recently, however, the direct in vivo assessment of liver and kidney cadmium burden in humans has provided additional data. Sufficient data on humans does exist, however, to make reasonable estimates of the increased risk for cadmium-induced renal dysfunction. In the present paper, a linear logistic regression model has been developed on the basis of liver and kidney cadmium burden. These relationships are discussed with respect to the concept of a critical concentration for the renal cortex. 14 refs., 3 figs., 2 tabs.

48903 (CONF-860949—1) Seedling tree responses to nutrient stress under atmospheric CO_2 enrichment. Luxmoore, R.J.; Norby, R.J.; O'Neill, E.G. (Oak Ridge National Lab., TN (USA). Environmental Sciences Div.). 1986. Contract AC05-84OR21400. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008243.

From 18. IUFRO world congress; Ljubljana, Yugoslavia (8 Sep 1986).

Three species of seedling trees were grown in pots containing low-nutrient soil for periods of up to 40 weeks under a range of atmospheric CO_2 concentrations. In all cases, total dry weight increased with CO_2 enrichment, with a greater relative increase in root weight than shoot weight. In an experiment with Pinus virginiana in open-top field chambers, phosphorus and potassium uptake did not increase with an increase in CO_2 from 365 to 690 $\mu L/L$, even though dry matter gain increased by 37% during the exposure period. In experiments with Quercus alba and Liriodendron tulipifera under controlled environment conditions there were obvious symptoms of nitrogen deficiency and total nitrogen uptake did not increase with CO_2 enrichment. However, dry weight gain was more than 90% higher at 690 $\mu L/L$ CO_2. The three experiments with CO_2 enrichment treatments demonstrate that increases in plant dry weight can occur without increased uptake of some nutrients from the low-nutrient soil. A mechanism for these responses may involve increased mobilization of nutrients in association with increased sucrose transport under elevated CO_2 conditions.

48904 (CONF-8406336—) Ad-hoc Working Group 'Impact of air pollution on forests': Methods and criteria for the assessment and monitoring of air pollution effects on forests. (Bundesministerium fuer Ernaehrung, Landwirtschaft und Forsten, Bonn (Germany, F.R.)). Jul 1985. 359p. (In German, English, French). NTIS (US Sales Only), PC A16/MF A01. File Number DE86752563.

From Meeting on methods and criteria for the assessment and monitoring of air pollution effects on forests; Freiburg im Breisgau, F.R. Germany (18 Jun 1984).

The meeting drew up a set of recommendations for future activities, which were subsequently endorsed by the twenty-first session of the Commission. In agreeing to keep the Working Group in existence, the Commission included in its terms of reference an item to prepare a broad framework for the assessment and monitoring of air pollution effects on forests, taking in account existing and planned systems applied in the member countries of the EFC (European Forestry Commission) and the NAFC (North American Forestry Commission). National reports and other documentations of Austria, Belgium, Bulgaria, Canada, CSSR, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Luxembourg, Netherlands, Norway, Poland, Sweden, Switzerland, United Kingdom and USA are tabled.

48905 (CONF-8606161—1) Complex mixtures: comparative chemical and toxicological characterization. Stamoudis, V.C.; Picel, K.C.; Haugen, D.A.; Vlastnik, V.J. (Argonne National Lab., IL (USA)). 1986. Contract W-31-105-ENG-38. 5p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014205.

From Conference on health and environmental effects of complex chemical mixtures; Delavan, WI, USA (16 Jun 1986).

Chemical and toxicological data were obtained for three energy-related materials, a by product oil from the Great Plains commercial gasifier (GPGG); a comparative research material, CRM-1, from the SRC-II coal-liquefaction process; and a shale oil standard reference material (SRM No. 1580) from the National Bureau of Standards. The materials are compared on the basis of mass and mutagenicity balances for major chemical fractions produced from standardized fractionation procedures. 2 tabs.

48906 (DOE/EV/03139—51) Embryo culture in teratological surveillance and serum proteins in development. Final technical report. Klein, N.W. (Connecticut Univ., Storrs (USA). Dept. of Animal Genetics). 1986. Contract AC02-76EV03139. 26p. (COO—3139-51). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014663.

An overview of the authors research into teratogenesis of blood serum of patients on medication or rats injected with drugs is presented. In addition studies concerning the role of methionine in the developing fetus is given. 68 refs.

48907 (NP—6752676) Effects of acid precipitations on aquatic organisms. Bibliographic list No. 8 (Rev. 1) as of August 1985. 2. ed. . (Bundesforschungsanstalt fuer Fischerei, Hamburg (Germany, F.R.). Informations- und Dokumentationsstelle). Oct 1985. 151p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE86752676.

A bibliography about half of which consists of quotations and short abstracts. The 'General Information' part contains literature on the 'origin' of acid precipitation, atmospheric transport and the legal, economic and political aspects. Another chapter contrains quotations from the chemistry of acidification, followed by elaborations on the effects on aquatic ecosystems: general and regional studies are supplied. The other chapters are on the effects on fish (numerous references to books on the subject) and the effects on molluscs, crustaceans, amphibians, insects, plankton and benthoe, acquatic plants. 10 bibliographies on this subject are supplied. (MG).

48908 (NP—6770133) Cadmium and soil microorganisms. Gruen, I. (Giessen Univ. (Germany, F.R.). Fachbereich Angewandte Biologie und Umweltsicherung). 23 Jul 1984. 113p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86770133.

In connection with the questions of how cadmium acts on soil microorganisms and how that action affects cadmium accumulation in the plant, investigations with groups of microorganisms (fungi, bacteria and streptomycetes) and some physiological groups (nitrificants, cellulose-decomposing and nitrogen-binding agents) as well as plants possessing no specific rhizome part flora were conducted. Changes in the different fractions of microorganism types are also important from an ecological viewpoint and were consequently studied at different cadmium levels.

48909 (NP—6770136) Acne picealis. Cutaneous and visceral effects of exposure to distillation products of coal and crude oil and their valuation for insurance. Kalus, J. (Bochum Univ. (Germany, F.R.). Medizinische Fakultaet). 19 Dec 1984. 72p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86770136.

This is a report on catamnestic and clinical studies carried out with Acne picealis patients some of whom were under observation for several years. Most probably not only the skin but also internal organs may be affected. Acne picealis patients not only display an overproportionally high morbidity rate of chronic bronchitis (30,7%) but also an increased chance of developing cancer of internal organs, especially excretory organs like colon and bladder. Consequences for insurance and prevention measures are discussed.

The term 'Acne picealis' does not fully describe the clinical picture and should be replaced by 'Acne picealis disease'.

48910 (PNL—5764) Hazard classification method for facilities containing toxic chemicals at the Pacific Northwest Laboratory. Backman, G.E.; Denovan, J.T.; Nisick, N.P.; Piatt, J.A. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 16p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014190.

This document presents guidance to management on how to proceed in determining if the quantity of nonradioactive toxic materials in any Pacific Northwest Laboratory (PNL) or PNL-managed facility constitutes a potential threat to the public or to employees outside the facility. The "Immediately Dangerous to Life or Health" concept developed by the Department of Health, the Institute of Occupational Safety and Health, the Occupational Safety and Health Administration, and contractors who work with these organizations has been used as the measuring device to determine potential effects. The hazard classes (low, moderate and high) defined in the Department of Energy Order 5481.1A have been used to determine the seriousness of the potential effects. The management requirements related to the hazard classification have also been included.

48911 (PNL-SA—13923) Trace rare earth element analysis of IAEA hair (HH-1), animal bone (H-5) and other biological standards by radiochemical neutron activation. Lepel, E.A.; Laul, J.C. (Pacific Northwest Lab., Richland, WA (USA)). Mar 1986. Contract AC06-76RL01830. 11p. (CONF-8606127—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013599.

From 7. international conference on modern trends in activation analysis; Copenhagen, Denmark (23 Jun 1986).

A radiochemical neutron activation analysis using a rare earth group separation scheme has been used to measure ultratrace levels of rare earth elements (REE) in IAEA Human Hair (HH-1), IAEA Animal Bone (H-5), NBS Bovine Liver (SRM 1577), and NBS Orchard Leaf (SRM 1571) standards. The REE concentrations in Human Hair and Animal Bone range from 10^{-8}g/g to 10^{-11}g/g and their chondritic normalized REE patterns show a negative Eu anomaly and follow as a smooth function of the REE ionic radii. The REE patterns for NBS Bovine Liver and Orchard Leaf are identical except that their concentrations are higher. The similarity among the REE patterns suggest that the REE do not appear to be fractionated during the intake of biological materials by animals or humans. 14 refs., 3 figs., 2 tabs.

48912 (UCRL—94281) Biomass production and nutrient responses of ponderosa pine to long-term elevated CO_2 concentrations. Fried, J.S.; Surano, K.A.; Daley, P.F.; Shinn, J.H.; Anderson, P. (Lawrence Livermore National Lab., CA (USA); California Univ., Berkeley (USA). Dept. of Forestry and Resource Management). Jun 1986. Contract W-7405-ENG-48. 10p. (CONF-8606147—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014435.

From 9. North American forest biology workshop; Stillwater, OK, USA (15 Jun 1986).

Ponderosa pine saplings and seedlings were continuously exposed to elevated CO_2 concentrations of ambient, and ambient +75, +150, and +300 ppm in open-top chambers for 27 months. Saplings responded by reducing above ground biomass production. Although potassium concentration in both saplings and seedlings diminished as CO_2 concentration increased, no nutrients appeared to become limiting to growth as a result of elevated CO_2. Concentrations of Ca, Mg, and Zn in the saplings at different concentrations of CO_2 mirrored root densitites, indicating that an increase in root density at +150 ppm may account for greater nutrient concentrations observed in that tree. 17 refs., 6 figs.

48913 Microsite abundance and distribution of woody seedlings in a South Carolina cypress-tupelo swamp. Huenneke, L.F.; Sharitz, R.R. (Savannah River Ecology Lab., Aiken, SC). *American Journal of Public Health;* **76**: No. 5, 328-335(May 1986). Contract AC09-76SR00819.

At least 16 types of microsites or substrates for vascular plant seedlings can be distinguished in bald cypress-water tupelo (Taxodium distichum-Nyssa aquatica) swamps. We measured the relative abundances of these microsite types, and the distribution of woody seedlings on them, in two riverine swamp forests on the Savannah River floodplain, South Carolina. Microsite abundances in a little disturbed forest differed significantly from those in a more open stand which had experienced much recent sediment deposition from upstream erosion, as well as higher water temperatures. Woody seedlings were distributed nonrandomly among microsite types (i.e., not in proportion to the abundance of a given microsite type). There were significant differences in microsite distribution patterns among growth forms (tree spp. vs. shrubs vs. vines) and among species within growth form. Many human activities may alter substrate nature and abundance in a wetland, thus indirectly altering the abundance and species composition of seedling recruitment.

48914 Enzymes from auxin-pretreated pea tissue which hydrolyze xyloglucan and a xyloglucan fragment oligosaccharide. O'Neill, R.A.; White, A.R.; York, W.S.; Darvill, A.G.; Albersheim, P. (Univ. of Georgia, Athens). **80**: No. 4, 31(Apr 1986).

From Annual meeting of the American Society of Plant Physiologists; Baton Rouge, LA, USA (8-12 Jun 1986).

Buffer extracts were prepared from stem tissue of young etiolated pea plants harvested several days after spraying with 2,4-D. Similar extracts were prepared from tissue not pretreated with 2,4-D. Extracts were partially purified by gel filtration to remove carbohydrates. Xyloglucan polymer and a xyloglucan nonasaccharide of known structure were used as substrates. Both substrates contain glucose, xylose, galactose and fucose. The ability of the pea-stem-extracts to enzymatically hydrolyze the glycosidic linkages of these substrates was determined by chemical derivatization of the enzyme reaction products and analysis by gas chromatography-mass spectrometry. Such experiments established that the extracts contained enzymes that hydrolyzed a portion of the glycosidic linkages of each of the four sugar types present in the substrates. Extracts of auxin-pretreated tissue hydrolyzed a greater proportion of the linkages of each type of sugar in the substrates. Work is currently underway to purify and characterize the enzymes responsible for the hydrolytic activities observed.

48915 Inhibition of Na^+-dependent uptake of hexose and amino acids in LLC-PK1 cells by amiloride and amiloride-derivatives. Cook, J.S.; Shaffer, C.; Cragoe, E.J. Jr. (Oak Ridge National Lab., TN). *Federation Proceedings, Federation of American Societies for Experimental Biology;* **45**: No. 3, 517(1 Mar 1986). (CONF-8604222—). Contract AC05-84OR21400.

From 70. annual meeting of the Federation of American Society for Experimental Biology; St. Louis, MO, USA (13 Apr 1986).

Post-confluent LLC-PK1 cells, a renal epithelial cell line from pig kidney, have at their apical borders a Na^+-dependent transport system for hexoses (assayed by the phlorizin-sensitive uptake of alpha-methylglucoside) and at their basolateral surfaces a Na^+-dependent A-system transporter for amino acids (assayed by the uptake of methylaminoisobutyric acid). Amiloride at high concentrations (4.5 mM) partially inhibits both of these transporters. The analogs 5-(N-methyl-N-isobutyl) amiloride and 5-(N-ethyl-N-isopropyl) amiloride can completely inhibit both systems with inhibitory coefficients of approximately 50 μM in 150 mM NaCl media. Na^+/H^+ exchange is also inhibited in these cells by these compounds, but at much lower concentrations. The inhibition of transport of the hexose is competitive with Na^+ in the assay medium at Na^+ concentrations below 10 mM.

48916 Mercury-binding proteins from the marine mussel, Mytilus edulis. Roesijadi, G. (Pennsylvania State Univ., University Park). *Environmental Health Perspectives;* **65**: 45-48(Mar 1986). Contract AC06-76RL01830.

The marine mussel, Mytilus edulis, possesses low molecular weight, metal-binding proteins which can be induced by and, in turn, bind mercury when individuals are exposed to low, but elevated concentrations of mercury as $HgCl_2$. Induction of the proteins by exposure of mussels to copper, cadmium, or mercury is associated with enhanced tolerance to mercury toxicity. Mercury-

binding proteins isolated from gills of mussels occur as two molecular weight variants of about 20-25 and 10-12 kdaltons, respectively, on Sephadex G-75. These have been designated as $HgBP_{20}$ and $HgBP_{10}$ following the nomenclature used for cadmium-binding proteins. $HgBP_{20}$ represents the primary mercury-binding species. Separation of $HgBP_{20}$ by anion-exchange high-performance liquid chromatography resulted in the resolution of six peaks, indicating a more complex situation than was evident from DEAE-cellulose separations. Although not completely purified, these also contain cysteine- and glycine-rich proteins.

48917 **Relationships between free cadmium ion activity in seawater, cadmium accumulation and subcellular distribution, and growth in polychaetes.** Jenkins, K.D.; Sanders, B.M. (California State Univ., Long Beach). *Environmental Health Perspectives;* 65: 205-210(Mar 1986).

We have examined the relationships between Cd ion activity (Cd^{2+}), in seawater, Cd accumulation and subcellular distribution and growth in the polychaete Neanthes arenaceodentata. Organisms were exposed for 3 weeks to a range of (Cd^{2+}) in a Cd-chelate buffer system. Cadmium accumulation and growth were monitored weekly for each exposure group and subcellular Cd distributions were determined at the end of the 3-week period. We found Cd associated with all of the subcellular fractions except the very low molecular weight ligands. Total Cd accumulation was greatest at day 7 and decreased over time in all but the highest (Cd^{2+}) where it remained constant. For each point in time, however, there was a linear relationship between total Cd and (CD^{2+}) in seawater. Linear relationships were also observed between (Cd^{2+}) and Cd loading in each subcellular ligand pool. Specific growth rates varied with both (Cd^{2+}) and time in a nonlinear manner.

48918 **Sister chromatid exchange induction and persistence in peripheral blood and spleen lymphocytes of mice treated with ethylnitrosourea.** Tucker, J.D.; Strout, C.L.; Christensen, M.L.; Carrano, A.V. (Lawrence Livermore National Lab., CA). *Environmental Mutagenesis;* 8: No. 3, 345-355(1986). Contract W-7405-ENG-48.

The induction and persistence of sister chromatid exchanges (SCEs) were studied in peripheral blood and spleen lymphocytes of mice given a single i.p. injection of ethylnitrosourea (ENU) of 100, 350, or 600 μMoles ENU/kg. SCE frequencies were measured on days 1, 3, 5, and 7, and at seven additional times up to 172 days post-injection. The SCE frequencies and proportion of HFCs in each dose and tissue remained elevated for up to 172 days following treatment, although the degree and statistical significance of the increase varied according to the tissue, dose, and statistical test employed. The SCE frequencies were found to oscillate during the first week. Following this, however, the return of the SCE frequencies to control levels was fit to a linear regression model with time as the only independent variable. The persistence of SCE-forming lesions was found to be dose-dependent for the spleen but not for blood. Within each dose the persistence of SCE-forming lesions was significantly greater for the blood relative to the spleen.

48919 **Tests for mutagenic effects of ammoniated glycyrrhizin, butylated hydroxytoluene, and gum arabic in roden germ cells.** Sheu, C.W.; Cain, K.T.; Rushbrook, C.J.; Jorgenson, T.A.; Generoso, W.M. (Food and Drug Administration, Washington, DC). *Environmental Mutagenesis;* 8: No. 3, 357-367(1986). Contract AC05-84OR21400.

Ammoniated glycyrrhizin, butylated hydroxytoluene, and gum Arabic are generally recognized as safe (GRAS) substances that are used primarily as additives in foods. These substances were incorporated into rodent diets and fed to male rats and mice for 10 and 8 wk, respectively. The treated male mice and rats were then tested for dominant lethal effects. The mice were also tested for induced heritable translocation. Results of the rat studies indicated a statistically significant dominant lethal effect of each of the compounds tested; however, the biological significance of this response is not known. Results of the mouse dominant lethal and heritable translocation studies, on the other hand, indicated no adverse effects of the compounds tested.

48920 **Review: putative mutagens and carcinogens in foods. VII. Genetic toxicology of the diet.** Hatch, F.T.; MacGregor, J.T.; Zeiger, E. (Lawrence Livermore National Lab., CA). *Environmental Mutagenesis;* 8: No. 3, 467-484(1986). Contract W-7405-ENG-48.

Individual reviews of approximately 30 papers presented at the Fourth International Conference on Environmental Mutagens are presented in this report. Topics covered include diet in cancer epidemiology; cooked and processed food as a source of mutagens and carcinogens; natural genotoxins in plants and beverages; mutagens within the gastrointestinal tract; and modulation of mutagenesis and carcinogenesis.

48921 **Classifying mutagens as to their specificity in causing the six possible transitions and transversions: a simple analysis using the Salmonella mutagenicity assay.** Levin, D.E.; Ames, B.N. (Univ. of California, Berkeley). *Environmental Mutagenesis;* 8: No. 1, 9-28(1986). Contract AS03-76EV70156.

The standard Salmonella tester strains used to detect base substitution mutations carry the hisG428 ochre mutation (TA102 and TA104) and the hisG46 missense mutation (TA100). These mutations can be reverted by base changes at their mutant his loci or at extragenic suppressor loci. The base changes resulting in each class of revertants of these mutations have been identified, and simple phenotypic screens have been developed to distinguish among them. These screens are the basis for a rapid and simple system for determining the base substitution specificity of mutagens using hisG428- and hisG46-containing tester strains. Diagnostic mutagens specific for each of the six possible base changes (transitions and transversions) have been identified. Using these diagnostic mutagens, two additional strains, each specifically reverted by a single base substitution mutation, have been developed to provide a minimum of two loci at which to detect each type of base change.The ability of this system to provide detailed information about mutational specificity in a variety of DNA repair backgrounds will allow further elucidation of the mechanisms of mutagenesis and DNA repair.

48922 **Interlaboratory comparison of transformation in Syrian hamster embryo cells with model and coded chemicals.** Tu, A.; Hallowell, W.; Pallotta, S.; Sivak, A.; Lubet, R.A.; Curren, R.D.; Avery, M.D.; Jones, C.; Sedita, B.A.; Huberman, E. (Arthur D. Little Inc., Cambridge, MA). *Environmental Mutagenesis;* 8: No. 1, 77-98(1986).

Three independent laboratories tested eight model and five coded chemicals in the Syrian hamster embryo clonal transformation assay system to establish the intra- and interlaboratory reproducibility of the system and to identify sources of variability. When a common cell pool and the same lot of fetal calf serum were used, the three laboratories obtained consensus on the activity of eight model chemicals; five chemicals (benzo(a)pyrene, 7,12-dimethylbenz(a)anthracene, N-methyl-N'-nitro-N-nitrosoguanidine, nitroquinoline-N-oxide, and lead chromate) induced morphological transformation without exogenous metabolic activation and three (N-2-fluorenylacetamide, pyrene, and anthracene) produced no transformation response. Five coded chemicals (2,6-dichloro p-phenylenediamine, 4,4'-oxydianiline, cinnamyl anthranilate, dichlorvos, and reserpine), representative of environmental chemical classes, but not necessarily strong carcinogens, produced more equivocal responses in this interlaboratory study. Efforts to increase the transformation frequency or to amplify the expression of the transformed phenotype constitute some of the approaches which should be explored in order to overcome these limitations.

48923 **Application of HPLC to the isolation of molecular targets in dosimetry studies.** Balhorn, R.; Mazrimas, J.A.; Corzett, M. (Univ. of California, Livermore). *Environmental Health Perspectives;* 62: 73-79(Oct 1985). Contract W-7405-ENG-48.

High-performance liquid chromatography (HPLC) methods are described which permit the rapid isolation of multiple target macromolecules from the tissues of animals exposed to chemical mutagens. DNA and selected chromosomal proteins are isolated in a simple two step separation scheme. The DNA peak is retained for

analysis and the chromatin proteins are dialyzed, lyophylized, and rechromatographed on a PRP-1 column to separate individual histones. Using this approach the authors have monitored the kinetics and dose response of adduct formation (and repair) to DNA, histone, hemoglobin and albumin in mice exposed to 7-bromomethylbenzanthracene and benzo[a]pyrene. The results of these studies are described and briefly discussed. Experiments with other mutagens demonstrate the limits to which DNA adduct quantification may be pushed using radioisotopes. Exposures to very high specific activity (200 Ci/mmole) benzo(a)pyrene have allowed DNA adduct quantification down to a few adducts per cell.

48924 **Cytotoxic and mutagenic effects of specific carcinogen-DNA adducts in diploid human fibroblasts.** McCormick, J.J.; Maher, V.M. (Michigan State Univ., East Lansing). *Environmental Health Perspectives;* 62: 145-155(Oct 1985).

A comparison of the cytotoxicity and mutagenicity of a series of carcinogens in normal diploid human fibroblasts and in cells deficient in one or more DNA repair processes has provided insight into the specific DNA adduct(s) responsible for these biological effects. The carcinogens tested include ultraviolet radiation; reactive derivatives of structurally related aromatic amides; metabolites of benzo(a)pyrene; the simple alkylating agents N-methyl-N'-nitro-N-nitrosoguanidine and N-ethyl-N-nitrosourea; and aflatoxin B_1 dichloride, a model for the reactive 2,3-epoxide of aflatoxin B_1. Exponentially growing cells were exposed to agents and assayed for mutations and cell killing. Cells deficient in repair of particular DNA adducts or lesions proved more sensitive to the agent causing those lesions than did normally repairing cells. Many of the carcinogens were compared for their mutagenic and/or cytotoxic effect, not only as a function of dose administered, but also as a function of the initial number of adducts or photoproducts induced in DNA and the number remaining at critical times posttreatment. The results demonstrated a high correlation between the number of DNA lesions remaining unexcised at the time the DNA was replicated and frequency of mutations induced. Comparative studies of the frequency of UV-induced transformation of normal and repair-deficient cells showed this also to be true for transformation.

48925 **Examination of adduct formation in vivo in the mouse between benzo(a)pyrene and DNA of skin and hemoglobin of red blood cells.** Shugart, L.; Kao, J. (Oak Ridge National Lab., TN). *Environmental Health Perspectives;* 62: 223-226(Oct 1985). Contract AC05-84OR21400.

The authors are interested in devising techniques which will allow them to measure and quantitate exposure to chemical carcinogens and which eventually can be used in risk analysis with humans. Recent research with HPLC/fluorescence has demonstrated that they can detect, identify, and quantitate the binding of benzo(a)pyrene (BaP) with DNA of mouse skin. The technique not only allows femtomole amounts of BaPDE associated with DNA isolated from a single mouse skin to be detected using conventional instrumentation, but also establishes the stereochemical origin of the adduct, and has been employed in the investigation reported here to estimate the concomitant binding of BaP to hemoglobin in vivo. The temporal existence of BaPDE/DNA adducts in mouse skin over a 5-week period showed that at 35 days after treatment, approximately 15% of the initial adducts were still detectable even though DNA turnover would predict that they should have been deleted from the genome. It is known that topically applied BaP is absorbed, metabolized, and excreted by the mouse. Examination of hemoglogin of mouse RBCs 24 hr after BaP treatment revealed covalent adduct formation exclusively via anti-BaPDE. The dose response of adduct binding to hemoglobin and DNA appeared to be similar.

48926 **Effects of passive smoking on health of children.** Ferris, G.B. Jr.; Ware, J.H.; Berkey, C.S.; Dockery, D.W.; Spiro, A. III; Speizer, F.E. (Harvard School of Public Health, Boston, MA). *Environmental Health Perspectives;* 62: 289-295(Oct 1985).

Analysis of data on the effects of passive smoking obtained in preadolescent children from the Harvard Six-Cities Study demonstrates an exposure-response relationship between the number of smokers in the household and the reporting rates for doctor-diagnosed respiratory illness before age 2, history of bronchitis, wheeze most days and nights apart from colds, and a composite of symptoms defined as the lower respiratory index. Similarly, when only the amount currently smoked by the mother was used, the data indicated a relatively uniform increase in each of the reported diseases and symptoms. FEV_1 was lower in children with smoking mothers compared to children of nonsmoking mothers. Rate of increases in FEV_1 after adjusting for normal growth was significantly smaller in children of smoking mothers and was related also to amount smoked. Although children of smoking mothers were shorter on the average than children of nonsmoking mothers, no ongoing passive smoking effect on height growth can be ascertained. All these differences are small and their medical significance remains to be defined.

48927 **Mt. St. Helens ash in lakes in the lower Grand Coulee, Washington State.** Edmondson, W.T.; Litt, A.H. (Univ. of Washington, Seattle). *Verhandlungen - Internationale Vereinigung fuer Theoretische und Angewandte Limnologie;* 22: 510-512(Jul 1984).

The Mt. St. Helens eruption dropped ash into two alkaline lakes in Central Washington State that had been under study for 30 years. These are Soap Lake and Lake Lenore in the Lower Grand Coulee. These lakes were first studied for interest in their specialized, limited flora and fauna and high productivity. Following dilution by fresh water from a large irrigation project, the lakes showed a profound change in community structure. Salinity was, however, finally stabilized. One species of trout - the Lahontan cutthroat trout - able to survive in alkaline, moderately saline water has been successfully introduced. A predation experiment established in 1979 was perturbed but not ruined by the ash from the Mt. St. Helens eruption, but it is still too early to see the effect of the trout on the benthos and the plankton, and to assess the trout's importance in the community.

5604 Other Environmental Pollutant Effects

48928 **(DOE/ET/29078—T2) Tissue interactions with nonionizing electromagnetic fields. Final report, March 1979-February 1986.** Adey, W.R.; Bawin, S.M.; Byus, C.V.; Cain, C.D.; Lin-Liu, S.; Luben, R.A.; Lyle, D.B.; Sagan, P.M.; Sheppard, A.R.; Stell, M.A. (Jerry L. Pettis Memorial Veterans Administration Medical Center, Loma Linda, CA (USA); Loma Linda Univ., CA (USA); California Univ., Riverside (USA). Div. of Biomedical Sciences). Aug 1986. Contract AI01-79ET29078. 21p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014715.

This report provides an overview of this research program focused on basic research in nervous system responses to electric fields at 60 Hz. The emphasis in this project was to determine the fundamental mechanisms underlying some phenomena of electric field interactions in neural systems. The five studies of the initial program were tests of behavioral responses in the rat based upon the hypothesis that electric field detection might follow psychophysical rules known from prior research with light, sound and other stimuli; tests of electrophysiological responses to "normal" forms of stimulation in rat brain tissue exposed in vitro to electric fields, based on the hypothesis that the excitability of brain tissue might be affected by fields in the extracellular environment; tests of electrophysiological responses of spontaneously active pacemaker neurons of the Aplysia abdominal ganglion, based on the hypothesis that electric field interactions at the cell membrane might affect the balance among the several membrane-related processes that govern pacemaker activity; studies of mechanisms of low frequency electromagnetic field interactions with bone cells in the context of field therapy of ununited fractures; and manipulation of cell surface receptor proteins in studies of their mobility during EM field exposure.

57 HEALTH AND SAFETY

48929 **Risk quantitation and regulatory policy.** Hoel, D.G.; Merrill, R.A.; Perera, F.P. (eds.). Cold Spring Harbor, NY; Cold Spring Harbor Laboratory (1985). 357p. (CONF-8405356—). Cold Spring Harbor Lab., Box 100, Cold Spring Harbor, NY 11724. File Number TI86001160. Contract FG02-84ER60214.

From Conference on risk quantitation and regulatory policy; Lloyd Harbor, NY, USA (13 May 1984).

The conference brought together legal, regulatory, and research representatives to consider the most efficacious ways in which the science of risk assessment might be made accessible and amenable to incorporation into regulatory policy formulations. Under consideration was the use of risk quantitation in regulatory decision making, the currently available methods for identifying and quantifying human health risks, applications of the procedures involved in specific case instances, and the mechanisms for most appropriately incorporating such analyses into regulatory policy. Separate abstracts have been prepared for individual papers. (ACR)

58 GEOSCIENCES

5801 Geology And Hydrology

REFER ALSO TO CITATION(S) 47214, 47311, 48058, 48064, 48084, 48575, 48583, 48592, 48601, 48733, 48735, 48939

48930 **(DOE/ER/13124—2) Structural evolution of the Central Brooks Range, Alaska. Final report, September 1, 1983-November 30, 1985.** Ave'Lallemant, H.G. (Rice Univ., Houston, TX (USA). Dept. of Geology and Geophysics). 1985. Contract AS05-83ER13124. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013986.

This report summarizes work completed in mapping in detail the following areas: (1) Doonerak Window; (2) Hammond River Klippe; and (3) Schist Belt. (ACR)

48931 **(DOE/ER/60376—12b) Physical oceanographic processes affecting larval transport around and through North Carolina inlets.** Pietrafesa, L.J.; Janowitz, G.S. (North Carolina State Univ., Raleigh (USA). Dept. of Marine, Earth and Atmospheric Sciences). 1985. Contract FG09-85ER60376. 46p. (CONF-8508188—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013057.

From Larval fish and shellfish transport through coastal inlets; Ocean Springs, MS, USA (19 Aug 1985).

Atlantic Spot, Flounder, Croaker and Menhaden all spawn in shelf waters of North Carolina during late fall to early winter. The juveniles use estuaries such as Pamlico Sound and the Cape Fear River as nurseries during their first winter and spring. Previous studies of recruitment into the estuaries through barrier island inlets or estarine mouths assume that the pre and post metamorphosed larvae enter the estuaries at the bottom of the water column and move upstream thereafter. The mechanisms were presumed tidal. The Pamlico Sound has several inlets, Oregon, Hatteras and ocracroke, through which larvae can enter not only during flood stages of the tide but also in the presence of favorable oceanic to estuary sea level pressure gradients. The Cape Fear River has a strong semi-diurnal tidal flow both flood and ebb and also responds vigorously to one-sided divergences and convergences at its mouth. Flow, looking out of the mouth, is in at the left and out on the right. The conclusions are that, in addition to flooding tides, nonlocal forcing at the estuary mouths can effect transport of larval fish through the estuary mouths, throughout the entire water column.

48932 **(DOE/ID/12524—T1) Geochemistry, isotopic composition and origin of fluids emanating from mud volcanoes in the Copper River Basin, Alaska. Final report.** Motyka, R.J.; Hawkins, D.B.; Poreda, R.J.; Jeffries, A. (Alaska Geological and Geophysical Surveys Div., Juneau (USA); Alaska Univ., Fairbanks (USA). Inst. of Water Resources; Scripps Institution of Oceanography, La Jolla, CA (USA); Global Geochemistry Corp., Canoga Park, CA (USA)). May 1986. Contract FG07-84ID12524. 89p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014383.

Two compositionally different groups of mud volcanoes exist in the Copper River Basin: the Tolsona group which discharges Na-Ca rich, HCO_3-SO_4 poor saline waters accompanied by small amounts of gas, composed predominately of CH_4 and N_2; and the Klawasi group which discharges Ca poor, Na-HCO_3 rich saline waters accompanied by enormous amounts of CO_2. The Tolsona-type water chemistry and isotopic composition could have been produced through the following processes: dilution of original interstitial seawaters with paleo-meteoric waters, possibly during a period of uplift in the mid-Cretaceous; loss of HCO_3 and SO_4 and modification of other constituent concentrations by shale-membrane filtration; further depletion of Mg, K, HCO_3, and SO_4, and enrichment in Ca and Sr through dolomitization, hydrolysis, and clay-forming processes; and leaching of B, I, Li, and SiO_2 from marine sediments. Compared to the Tolsona waters, the Klawasi waters are strongly enriched in Li, Na, K, Mg, HCO_3, SO_4, B, SiO_2 and $\delta^{18}O$ and strongly depleted in Ca, Sr and D. The Klawasi wates also contain high concentrations of arsenic (10 to 48 ppM). The differences in fluid chemistry between Klawasi and Tolsona can be explained as the result of the interaction of fluids derived from a magmatic intrusion and contact decarbonation of limestone beds underlying the Klawasi area with overlying Tolsona-type formation waters.

48933 (INIS-mf—10174, pp X/43) **Cosmogenic sodium-22 and dating of natural fresh waters.** Fleishman, D.G.; Gorin, V.D.; Gritchenko, Z.G. (AN SSSR, Leningrad. Inst. Ehvolyutsionnoj Fiziologii i Biokhimii; AN SSSR, Moscow. Inst. Geokhimii i Analiticheskoj Khimii; Radievyj Inst., Leningrad, USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48934 (INIS-mf—10174, pp X/45) **Early Slavic settlements and navigation at the mouth of Odra river.** Awsiuk, R.; Goslar, T.; Pazdur, A.; Pazdur, M.F.; Filipowiak, W. (Politechnika Slaska, Gliwice, Poland. Inst. Fizyki; National Museum, Szczecin, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48935 (INIS-mf—10174, pp X/46) **Radiocarbon dating and late glacial blown sand movements in NE Hungary.** Csongor, E.; Borsy, Z. (Magyar Tudomanyos Akademia, Debrecen. Atommag Kutato Intezete; Kossuth Lajos Tudomanyegyetem, Debrecen, Hungary). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48936 (INIS-mf—10174, pp XI/60) **Radiocarbon dating in palaeomorphological and sedimentological research, the example of the Mark river basin.** Van Strydonck, M.; Dauchot-Dehon, M.; Huybrechts, W. (Koninklijk Instituut voor het Kunstpatrimonium, Brussels, Belgium; Vrije Univ., Brussels, Belgium). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48937 (INIS-mf—10174, pp XVI/98) **$^{230}Th/^{234}U$ dating of carbonate cave deposits in Poland.** Dulinski, M.; Rozanski, K. (Institute of Physics and Nuclear Techniques, Krakow, Poland). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48938 **(ORNL/TM—9678) Application of the finite element groundwater model FEWA to three regional aquifers.** Wong, K.F.V.; Yeh, G.T. (Oak Ridge National Lab., TN (USA)). Jun 1986. Contract AC05-84OR21400. 112p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86014408.

This report documents the calibration with field data and predictive application of a finite element model of water through aquifers (FEWA). FEWA was described in a report written by G.T. Yeh and D.D. Huff in 1983. The model was first compared with the United States Geological Survey (USGS) two-dimensional model and found superior in treating anisotropic media when the coordinates cannot be made to coincide with the principal directions of hydraulic conductivities. In addition, there was no necessity to define nodal points outside the region, as required by the USGS model. FEWA was next calibrated with measured potentiometric surfaces from the Love Canal area in New York and the Conesville area in Ohio. There were satisfactory matches between computed results and available field data. The calibration and predictive runs of FEWA were then accomplished with the Hialeah-Preston well field data over the Biscayne aquifer in south Florida. The calibration run yielded two values of hydraulic conductivity in the area, and the predictive run gave results that matched well with available data. 18 refs., 28 figs.

5802 Geophysics

REFER ALSO TO CITATION(S) 48930, 48947, 49622

48939 **(BMI/ONWI—606) Evaluation of seismic reflection data in the Davis and Lavender Canyons study area, Paradox Basin, Utah.** Kitcho, C.A.; Wong, I.G.; Turcotte, F.T. (Woodward-Clyde Consultants, San Francisco, CA (USA)). Aug 1986. Contract AC02-83CH10140. 53p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86015026.

Seismic reflection data purchased from petroleum industry brokers and acquired through group speculative surveys were interpreted for information on the regional subsurface geologic structure and stratigraphy within and surrounding the Davis and Lavender Canyons study area in the Paradox Basin of southeastern Utah. Structures of interest were faults, folds, joints, and collapse structures related to salt dissolution. The seismic reflection data were used to interpret stratigraphy by identifying continuous and discontinuous reflectors on the seismic profiles. Thickening and thinning of strata and possible areas of salt flowage or dissolution could be identified from the seismic data. Identifiable reflectors included the tops of the Precambrian and Mississippian, a distinctive interbed close to the middle of the Pennsylvanian Paradox salt formation (probably the interval between Salt Cycles 10 and 13), and near the top of the Paradox salt. Of the 56 faults identified from the seismic reflection interpretation, 33 trend northwest, west-northwest, or west, and most affect only the deeper part of the stratigraphic section. These faults are part of the deep structural system found throughout the Paradox Basin, including the fold and fault belt in the northeast part of the basin. The faults bound basement Precambrian blocks that experienced minor activity during Mississippian and early Pennsylvanian deposition, and showed major displacement during early Paradox salt deposition as the Paradox Basin subsided. Based on the seismic data, most of these faults appear to have an upward terminus between the top of the Mississippian and the salt interbed reflector.

48940 **(N—86-23089) Workshop on the Tectonic Evolution of Greenstone Belts.** (Lunar and Planetary Inst., Houston, TX (USA)). 1986. 143p. (NASA-CR—176619; CONF-860180—). NTIS, PC A07/MF A01.

From Workshop on the tectonic evolution of greenstone belts; Houston, TX, USA (16 Jan 1986).

The Workshop on the Tectonic Evolution of Greenstone Belts, which is part of the Universities Space Research Association, Lunar and Planetary Institute, of Houston, Texas, met there on Jan. 16-18, 1986. A number of plate tectonic hypotheses have been proposed to explain the origin of Archean and Phanerozoic greenstone/ophiolite terranes. These hypotheses are explored in the abstracts.

48941 (N—86-23089, pp vp) **High precision U-Pb geochronology and implications for the tectonic evolution of the Superior Province.** Davis, D.W.; Corfu, F.; Krogh, T.E. 1986. NTIS, PC A07/MF A01. (NASA-CR—176619; CONF-860180—).

From Workshop on the tectonic evolution of greenstone belts; Houston, TX, USA (16 Jan 1986).

The underlying mechanisms of Archean tectonics and the degree to which modern plate tectonic models are applicable early in Earth's history continue to be a subject of considerable debate. A precise knowledge of the timing of geological events is of the utmost importance in studying this problem. The high precision U-Pb method has been applied in recent years to rock units in many areas of the Superior Province. Most of these data have precisions of about + or - 2-3 Ma. The resulting detailed chronologies of local igneous development and the regional age relationships furnish tight constraints on any Archean tectonic model. Superior province terrains can be classified into 3 types: (1) low grade areas dominated by meta-volcanic rocks (greenstone belts); (2) high grade, largely metaplutonic areas with abundant orthogneiss and foliated to massive I-type granitoid bodies; and (3) high grade areas with abundant metasediments, paragneiss and S-type plutons. Most of the U-Pb age determinations have been done on type 1 terrains with very few having been done in type 3 terrains. A compilation of over 120 ages indicates that the major part of igneous activity took place in the period 2760-2670 Ma, known as the Kenoran event. This event was ubiquitous throughout the Superior Province.

48942 **(NUREG/CR—4705) Identification of a northwest trending seismogenic graben near Charleston, South Carolina.** Lennon, G. (South Carolina Univ., Columbia (USA). Dept. of Geology). Aug 1986. 50p. NTIS, PC A03/MF A01 - GPO. File Number TI86901646.

Shallow stratigraphic drilling (to approximately 85 m) and gamma logging in the miezoseismal area of the Charleston, 1886 earthquake was used to map three Tertiary unconformities. Results suggest the presence of a northwest extending graben lying between Charleston and Kiawah Island, SC. The 40 km long and 18 km wide graben is bounded on three sides by inferred, mappable faults. These are the Woodstock Fault on the northwest, the Ashley River Fault on the southwest and the Charleston Fault on the northeast. The Charleston fault extends northwest from Goose Creek, near Charleston through Woodstock and toward Ridgeville. It lies parallel to and a few kilometers to the northeast of a similar trace developed on the base of the middle Eocene Santee Limestone reported by Colquhoun and others. The Ashley River Fault extends northwest from Kiawah Island through or near Rantowles, SC. Sparse gamma-log control does not allow for a precise location of the trace or its displacement, as is the case for the Charleston Fault. Nevertheless, the zone of tectonic distortion has been limited to three kilometers of a line joining central Kiawah Island and Rantowles. Findings herein are supported by releveling data. Also these findings are useful to explain hydrogeologic anomalies reported and encountered in the Charleston area. The Ashley River Fault and the Charleston Fault are projected to land surface using cross-sections of Pleistocene sediments and geodetic data.

48943 **Mantle circulation and the lateral migration of subducted slabs.** Garfunkel, Z.; Anderson, C.A.; Schubert, G. (Department of Geology, The Hebrew University of Jerusalem, Israel). *Journal of Geophysical Research;* **91**: No. B7, 7205-7224(10 Jun 1986).

The irregular motions of plates and the irregular distribution of plate consumption and generation require that subduction zones and descending lithospheric slabs migrate laterally. Absolute plate motions indicate that slab migration is generally retrograde; that is, it is opposite to the direction of motion of the plates to which the slabs are attached, at rates of 10—25 mm yr^{-1}. As a result, the

downward motions of slabs are generally steeper than their dips, probably because of their negative buoyancy relative to the surrounding mantle. An important consequence of lateral slab migration is the displacement of material away from one side of the slab and inward flow of an equal volume toward the other side. This generates a mass flux in the mantle that is comparable in magnitude with the flux involved in the overturn of the oceanic lithosphere. The flow induced by slab migration is, therefore, an important part of the large-scale mantle circulation associated with plate motions. Two-dimensional numerical models with retrograde slab migration explicitly prescribed as a boundary condition show that migrating slabs, in contrast with nonmigrating ones, are at an angle to streamlines in the surrounding mantle.

48944 **Attenuation and scattering of broadband P-italic and S-italic waves across North America.** Taylor, S.R.; Bonner, B.P.; Zandt, G. (Earth Sciences Division, Lawrence Livermore National Laboratory, University of California, Livermore). *Journal of Geophysical Research;* **91**: No. B7, 7309-7325(10 Jun 1986).

Differential attenuation (δt-italic*) measurements of teleseismic P-italic and S-italic waves are made in the frequency range 0.05—5.0 Hz across North America using broadband seismic data from the Department of Energy's Regional Seismic Test Network and Lawrence Livermore National Laboratory's Basin and Range network. Data from four events have been analyzed by first assuming frequency independent Q-italic. The observed regional variations for (δt-italic*) are consistent with previous studies and show greater attenuation for stations in the Basin and Range relative to those in shield regions of North America.

5803 Mineralogy, Petrology, And Rock Mechanics

REFER ALSO TO CITATION(S) 47441

48945 **(DOE/ER/13414—1) Activity-composition relationships in silicate melts. Annual progress report, 1985-1986.** (North Carolina Univ., Chapel Hill (USA). Dept. of Geology). 2 Jun 1986. Contract FG05-85ER13414. 2p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014685.

A phase diagram was experimentally constructed for mixtures of basalt and rhyolite. Progress in research aimed at understanding phase relationhips in mixed magmas is described. (ACR)

48946 (INIS-mf—10174, pp XVI/95) **Using radon as probe for investigating characteristics of fractures in crystalline minerals.** Amin, B.S.; Rama. (Tata Inst. of Fundamental Research, Bombay, India). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48947 **(LA-UR—86-2581) Heteromorphism and crystallization paths of katungites, Navajo volcanic field, Arizona, USA.** Laughlin, A.W.; Charles, R.W.; Aldrich, M.J. Jr. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 33p. (CONF-860890—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013827.

From 4. international Kimberlite conference; Perth, Australia (10 Aug 1986).

A swarm of thin, isochemical but heteromorphic dikes crops out in the valley of Hasbidito Creek in NE Arizona. The swarm is part of the dominantly potassic, mid-Tertiary Navajo volcanic field of the Colorado Plateau. Whole-rock chemical analyses of five samples from four of the dikes indicate that they are chemically identical to the katungites of Uganda. These dikes show the characteristic seriate-porphyritic texture of lamprophyres. Samples of an olivine-melilitite dike from the same swarm lack this texture and the chemical analysis, while similar to those of the other dikes, shows effects from the incorporation of xenocrystic olivine. Over 20 mineral phases have been identified in the Arizona samples and as many as 18 phases may occur in a single sample. The major phases are phlogopite, olivine, perovskite, opaque oxides, +- melilite and +- clinopyroxene. Based upon the modal mineralogies and textures of ten dike samples, we recognize five general non-equilibrium assemblages. Comparison of these assemblages with recent experimental results shows that they represent various combinations of complete and incomplete reactions. Reaction relations were determined by entering melt and phase compositions into the computer program GENMIX to obtain balanced reactions. By combining petrographic observations with mineral chemical data, balanced reactions from GENMIX, and the recently determined phase diagrams we are able to trace crystallization paths for the katungite magma.

48948 **(UCRL—53630) Hydrothermal interaction of crushed Topopah Spring tuff and J-13 water at 90, 150, and 250°C using Dickson-type, gold-bag rocking autoclaves.** Knauss, K.G.; Beiriger, W.J.; Peifer, D.W. (Lawrence Livermore National Lab., CA (USA)). May 1985. Contract W-7405-ENG-48. 29p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014752.

As part of the Package Environment subtask of the Waste Package task within the Nevada Nuclear Waste Storage Investigations (NNWSI) Project, experiments were conducted to study the hydrothermal interaction of rock and water representative of a potential high-level waste repository in tuff. These experiments used crushed Topopah Spring tuff from both drillcore and outcrop samples. The data, when considered in conjunction with results from analogous experiments using solid wafers of tuff, define near-field repository conditions and can be used to assess the ability to use "accelerated" tests based on the surface area/volume (SA/V) parameter and temperature; allow the measurement of chemical changes due to reaction in phases present in the tuff before reaction; and permit the identification and chemical analysis of secondary phases resulting from hydrothermal reactions. Some of the results presented in this report have been used to demonstrate the usefulness of geochemical modeling in a repository environment using the EQ3/6 thermodynamic/kinetic geochemical modeling code. The tuff was reacted with a natural ground water in Dickson-type gold-bag rocking autoclaves that were periodically sampled under in situ conditions. Five short-term (<90-day) experiments using crushed tuff were run covering the range 90 to 250°C and 50 to 100 bars. This report will focus on the results of experiments with crushed tuff, while a companion report will cover results of analogous short-term experiments run with solid waters of tuff.

48949 **Use of digital image analysis to estimate fluid permeability of porous materials: Application of two-point correlation functions.** Berryman, J.G.; Blair, S.C. (Lawrence Livermore National Laboratory, University of California, P.O. Box 808 L-156, Livermore, California 94550). *Journal of Applied Physics;* **60**: No. 6, 1930-1938(15 Sep 1986).

Scanning electron microscope images of cross sections of several porous specimens have been digitized and analyzed using image processing techniques. The porosity and specific surface area may be estimated directly from measured two-point spatial correlation functions. The measured values of porosity and image specific surface were combined with known values of electrical formation factors to estimate fluid permeability using one version of the Kozeny-Carman empirical relation. For glass bead samples with measured permeability values in the range of a few darcies, our estimates agree well (+- 10—20%) with the measurements. For samples of Ironton-Galesville sandstone with a permeability in the range of hundreds of millidarcies, our best results agree with the laboratory measurements again within about 20%. For Berea sandstone with still lower permeability (tens of millidarcies), our predictions from the images agree within 10—30%. Best results for the sandstones were obtained by using the porosities obtained at magnifications of about 100 x (since less resolution and better statistics are required) and the image specific surface obtained at magnifications of about 500 x (since greater resolution is required).

48950 **Phase transitions, Grueneisen parameter, and elasticity for shocked iron between 77 GPa and 400 GPa.** Brown, J.M.; McQueen, R.G. (Geophysics Program, University of Washington, Seattle). *Journal of Geophysical Research;* **91**: No. B7, 7485-7494(10 Jun 1986).

Sound velocities determined in iron, shock compressed to pressures between 77 GPa and 400 GPa, indicate that two phase

transitions exist on the Hugoniot. A discontinuity in sound velocities at 200 +- 2 GPa may mark the transition of epsilon-c iron to γ iron. A second discontinuity at 243 +- 2 GPa is believed to indicate the onset of melting. The calculated temperature at melting lies between 5000 K and 5700 K. When extrapolated from the Hugoniot melting point, the Lindermann criterion yields an estimate of 5800 +- 500 K for the melting of pure iron at the inner core boundary pressure of 330 GPa. The product of density times the thermodynamic Grueneisen parameter in liquid iron, calculated from the present data, is 19.6 +- 0.8 Mg m^{-3}. A temperature profile ranging from 3800 K at the core-mantle boundary to 5000 K at the earth's center is calculated using the present data. Sound velocities for epsilon-c iron provide a better match to seismic velocities for the earth's inner core than do those of γ iron. A comparison between liquid iron velocities and the velocity profile through the outer core provides further evidence for alloying of iron with "lighter elements" in the core.

5804 Geochemistry

REFER ALSO TO CITATION(S) 48068, 48946, 48955

48951 (BMI/ONWI—512) Preliminary thermomechanical analyses of a conceptual nuclear waste repository at four salt sites. Wagner, R.A.; Loken, M.C.; Tammemagi, H.Y. (RE/SPEC, Inc., Albuquerque, NM (USA)). Jul 1986. Contract AC02-83CH10140. 231p. NTIS, PC A11/MF A01; GPO Dep. File Number DE86014477.

This report describes preliminary thermal and thermomechanical numerical analyses of a potential nuclear waste repository at four salt sites: Paradox Basin, Utah; Permian Basin, Texas; Richton Dome, Mississippi; and Vacherie Dome, Louisiana. The analysis is subdivided according to three distinct geometric regions: canister, disposal room, and repository. An evaluation of the thermal and thermomechanical responses is performed to assess the suitability of each site to host a nuclear waste repository, under a given set of conceptual design assumptions that have not been optimized. In order to compare the thermal and thermomechanical responses of the rock, the same base case repository conditions were assumed to be used as a ruler to measure salt response relative to each site. Absolute values have not been determined; this report presents a relative comparison of differences that exist between sites due to depth and salt creep characteristics. This report represents the first attempt at calculating relative differences in rock responses and in no way represents values which should be used in a specific design. 44 refs., 21 figs., 11 tabs.

48952 (NP—6770137) Distributions of trace elements, secondary elements and main elements on sediments and manganese nodules in the Central Pacific south east of Hawaii. Guerkan, A. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 6 Feb 1981. 178p. (In German). NTIS (US Sales Only), PC A09/MF A01. File Number DE86770137.

The distribution of the trace elements, the additional and main elements within the samples of sediment cares and manganese nodules from the Central Pacific Ocean was studied. The principal interest of the chemical investigations was concerned with the heavy metals Mn, Fe, Co, Ni, Cu, and Zn, which are contained as well in the Pacific ocean sediments as in micro- and macro nodules. The distribution of the heavy metal contents depending upon their genetic origin was determined. (HK).

48953 Geochemistry of lead in rivers, estuaries and the continental shelf of the southeastern US. Windom, H.L.; Smith, R.G.; Maeda, M. (Skidaway Institute of Oceanography, Savannah, GA). 17: 43-56(1985).

Transport by southeastern rivers has insignificant influence on the lead concentration of southeastern shelf waters. If the rate of mobilization and transport of lead by these rivers is representative of uncontaminated fluvial transport during the Pleistocene, only about 5% of the prehistoric output of lead to the North Atlantic can be accounted for by river input. Lead concentrations in southeastern shelf waters are similar to those of North Atlantic Water from the upper 1000 m, which is probably similar to the intrusion source water for the shelf. Atmospheric inputs to the shelf of the same magnitude as observed for the Western North Atlantic are difficult to reconcile given the residence time of shelf waters and their lead concentration unless the rate of loss of lead to shelf sediments is about the same as the atmospheric flux. 29 references, 2 figures, 5 tables.

5805 Oceanography

REFER ALSO TO CITATION(S) 48952

48954 (BNL—38342) Biological processes associated with the pycnocline and surface fronts in the southeastern Bering Sea. Whitledge, T.E.; Walsh, J.J. (Brookhaven National Lab., Upton, NY (USA). Applied Science Dept.; University of South Florida, St. Petersburg (USA). Dept. of Marine Science). 1985. Contract AC02-76CH00016. 17p. (CONF-8505303—1). NTIS, PC A02. File Number DE86014135.

From 17. international Liege colloquim on ocean hydrodynamics; Liege, Belgium (13 May 1985).

The southeast Bering Sea was sampled for five years between the Pribilof Islands and the Aleutian chain to investigate the significance of frontal regions on nutrient and chlorophyll distributions. Analysis of the data demonstrated that the fronts were always identifiable by either nutrient or chlorophyll concentrations. (ACR)

48955 (INIS-mf—10189) Determination of deep water circulation in the East Atlantic Ocean by means of a box-model based evaluation of C-14 measurements and other tracer data. Schlitzer, R. (Heidelberg Univ. (Germany, F.R.). Naturwissenschaftlich-Mathematische Gesamtfakultaet). 1984. 101p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752581.

Radiocarbon (C-14) measurements proved to be an efficient means of determining the average, large-area deep water circulation in the Atlantic Ocean. The thesis under review explains and discusses measurements carried out in the equatorial West Atlantic and North Atlantic Ocean. The samples have been taken during mission 56 of the RS 'meteor' in spring 1981. The gas has been obtained by vacuum extraction and the measurements have been performed in proportional counter tubes, the error to be accounted for amounting to 2per mille. These measured data, together with measurements of the potential temperatures, the silicate and CO_2 concentrations, and measured data from the South-East Atlantic Ocean, have been used to calculate on the basis of a box model of the Atlantic Ocean the deep water flow from the West to the East Atlantic Ocean, the deep water circulation between the various East Atlantic basins, and the turbulent diffusion coefficients required to parameterize the deep water mixing processes.

48956 (SAND—86-0829) In situ heat transfer experiment (ISHTE): Ocean Test Cruise report (Alcyone Cruise, Leg IV) September 1985. Percival, C.M. (ed.). (Sandia National Labs., Albuquerque, NM (USA). Seabed Programs Div.). Aug 1986. Contract AC04-76DP00789. 128p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE86014743.

In September of 1985 a cruise was conducted aboard the Research Vessel Melville to test the In Situ Heat Transfer Experiment (ISHTE). This was the final test of the experiment before its 1-yr deployment. The location of the test was the designated ISHTE site, MPG-I, 1100 km north of Hawaii. The water depth at MPG-I is 5800 m. In addition to testing ISHTE, the cruise included biological activities in support of the Subseabed Disposal Project. During the recovery operation, the ISHTE platform was accidently dropped to the seafloor with the backup recovery line deployed. A subsequent biology operation cut this line and necessitated a grapnel recovery. Even though the testing of the platform was significantly disrupted by the accident, the majority of the platform equipment was operated and performed satisfactorily. The accident indicates that the ISHTE platform can probably be recovered from the seafloor under most circumstances by using an accurate navigational system.

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REFER ALSO TO CITATION(S) 48446, 48547, 48581, 48608, 48632, 49306, 49306, 49344, 49391

48957 (AD-A—167374/8/XAB) North/south asymmetry in solar activity and its effects on the high-energy cosmic-ray diurnal variation. Shea, M.A.; Smart, D.F.; Swinson, D.B.; Humble, J.E. (New Mexico Univ., Albuquerque (USA). Dept. of Physics and Astronomy). 1986. 7p. NTIS, PC A02/MF A01.

Using a data base extending from 1955 through 1980 we find that the northern hemisphere of the sun was decidedly more active than the southern hemisphere for the period 1959 through 1970. From 1971 through 1980 there was no systematic asymmetry. Extending the time period through 1984, but using a different data base, we find an apparent change around October 1982, after which there are decidedly more flares occurring in the southern hemisphere of the sun than in the northern hemisphere. Examination of the diurnal variation amplitude present in the extremely high energy (approximately 100 GeV) cosmic radiation measurements indicates a consistent north/south asymmetry until about 1971 which we suggest is the result of the asymmetric solar activity.

48958 (AD-A—167692/3/XAB) Amplitude distribution of cosmic ray events in extrinsic IR detectors. Technical report. Aukerman, L. (Aerospace Corp., El Segundo, CA (USA). Electronics Research Lab.). 15 Mar 1986. 23p. (TR—0086(6427-01)-1). NTIS, PC A02/MF A01.

A method of calculating the amplitude distribution of cosmic-ray events in IR detectors utilizing known range-energy relationships for the various cosmic particles (mostly protons and helium nuclei) and published cosmic-ray energy spectra is described. Good agreement is obtained between the calculated amplitude distribution and the spurious events observed in an extrinsic detector during a flight test.

48959 (AD-A—167923/2/XAB) Periodic amplitude variations in Jovian continuum radiation. Progress report for period ending February 1986. Kurth, W.S.; Gurnett, D.A.; Scarf, F.L. (Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy). 2 Apr 1986. 31p. NTIS, PC A03/MF A01.

An analysis of periodic variations in the amplitude of continuum radiation trapped in the Jovian magnetosphere shows structure with periods near both five and ten hours. Contrary to a plausible initial idea, the continuum amplitudes are not organized by position of the observer relative to the dense plasma sheet. Instead, there seem to be preferred orientations of system III longitude with respect to the direction to the sun which account for the peaks. This implies a clock-like modulation of the continuum radiation intensity as opposed to a searchlight effect. The importance of the dipole longitude-solar wind alignment to the amplitude of the continuum radiation implies the source region of the radiation is near the magnetopause and may tie the generation of the radio waves to the clock like modulation of energetic electron fluxes from Jupiter.

48960 (AD-A—167924/0/XAB) Plasma-wave observations at Uranus from Voyager 2. Progress report for period ending February 1986. Gurnett, D.A.; Kurth, W.S.; Scarf, F.L.; Poynter, R.L. (Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy). 26 Mar 1986. 21p. NTIS, PC A02/MF A01.

Radio emissions from Uranus were detected by the Voyager 2 plasma-wave instrument about 5 days before closest approach at frequencies of 31.1 and 56.2 khz. The bow shock was identified by an abrupt broadband burst of electrostatic turbulence about 10 hours before closest approach at a radial distance of 23.5 ru. Once inside of the magnetosphere, strong whistler mode hiss and chorus emissions were observed at radial distances less than about 8 R/sub u/, in the same region where the energetic-particle instruments detected intense fluxes of energetic electrons. A variety of other plasma waves, such as (f sub c) electron-cyclotron waves, were also observed in this same region. At the ring plane crossing, the plasma wave instrument detected a large number of impulsive events that are interpreted as impacts of micron-sized dust particles on the spacecraft. The maximum impact rate was about 20 to 30 impacts/sec, and the north-south thickness of the impact region was about 4000 km. This paper presents an overview of the principal results from the plasma-wave instrument, starting with the first detection of radio emissions from Uranus, and ending a few days after closest approach.

48961 (ANL—85-22, pp 98-99) Feasibility studies of accelerator mass spectrometry of ^{205}Pb and its application to solar neutrino detection. Henning, W.; Kutschera, W.; Ernst, H.; Korschinek, G.; Kubik, P.W.; Mayer, W.; Morinaga, H.; Nolte, E.; Ratzinger, U.; Mueller, M.; Schuell, D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

^{205}Tl was proposed as a geological solar-neutrino detector nine years ago by M. Freedman and his collaborators at Argonne. However, a ^{205}Tl experiment has several severe problems which need to be solved before it can be useful. The present experiment was directed at the detection and identification of the ^{205}Pb atoms in a geological sample at ultralow concentration. The authors recent involvement in the technique of accelerator mass spectrometry which allows the detection of radioisotopes at extremely low concentrations suggested to them the application of this technique to ^{205}Pb. Employing the high-energy ion beams (2.3 GeV) from the UNILAC accelerator at the GSI Darmstadt, they are able to demonstrate a suppression of neighboring isotopes to better than 1 in 10^{10} and of neighboring elements to about 1 in 10^{3}. While these results are very encouraging, the minimum number of atoms detectable is still severely limited by the efficiency of producing multiply-charged ions from present ion sources. Future improvements in ion-source performance are presently being investigated.

48962 (ANL-HEP-CP—86-39) New evidence from Soudan 1 for underground muons associated with Cygnus X-3. Ayres, D.S. (Argonne National Lab., IL (USA). High Energy Physics Div.). 5 Jun 1986. Contract W-31-109-ENG-38. 5p. (CONF-860575—34). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014587.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

The Soudan 1 experiment has obtained additional evidence for underground muons associated with the x-ray pulsar Cygnus X-3. We report the preliminary analysis of data recorded during the October 1985 radio outburst of Cygnus X-3, which show a significant excess of muons for a narrow range of Cygnus X-3 phases.

48963 (CEA-CONF—7944) Neutron stars and supernovae. Schaeffer, R. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1984. 17p. (In French). (CONF-8409260—2). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750866.

From CERN accelerator school; Gif-sur-Yvette, France (3 Sep 1984).

The neutron star observations and theoretical estimations are presented; composition model is given. The presupernova, supernova collapse and observation of neutrinos emitted by a supernova are also presented.

48964 (DOE/ER/10719—T3) Research in nuclear astrophysics: stellar collapse and supernovae. Progress report. Lattimer, J.M.; Yahil, A. (State Univ. of New York, Stony Brook (USA)). Aug 1986. Contract AC02-80ER10719. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014252.

This proposal describes the nuclear astrophysics research program in the Earth and Space Sciences Department at Stony Brook. The central themes in the many projects that comprise this program are supernovae, neutron star formation, and the equation of state of hot, dense matter. There is a close coupling between the physics of nuclear matter on the one hand, and supernova and neutron stars on the other. (The collapse of massive stars is thought to lead to Type II supernovae and the creation of neutron stars. A

summary of the historical background and of recent developments in the theory of Type II supernovae, complete with references, is contained in the Appendix.) The properties of nuclear matter, together with those of the weak interactions, determine the outcome of models of Type II supernovae; thus, optical observations of supernovae and neutrons stars may set some limits on the nuclear equation of state. In the future, the detection of neutrinos, which are the only available observables of the internal supernova mechanism, will impose tighter constraints on nuclear matter properties.

48965 **(DOE/ER/40048—171-L6) Search for the beta-decay of ^{180}Lu to ^{180}Hf/sup m/.** Kellogg, S.E.; Norman, E.B. (Washington Univ., Seattle (USA). Nuclear Physics Lab.; Lawrence Berkeley Lab., CA (USA)). 1986. Contract AC03-76SF00098;AC06-81ER40048. 29p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014378.

The t/sub 1/2/ = 5.7 minute ^{180}Lu isotope was produced in the ^{180}Hf(n,p) reaction and its subsequent β decay back to ^{180}Hf was studied with a Ge(Li) spectrometer. A radiochemical technique was used to measure the fractional population of the I/sup π/,K=(8$^-$,8) isomer in ^{180}Hf to be f/sub m/ = 0.005 +- 0.018%. The limit of f/sub m/ is shown to be too small to account for the nucleosynthesis of ^{180}Ta/sup m/ in the r-process. The possible existence of a high-spin isomer in ^{180}Lu and its astrophysical consequences are discussed. 23 refs., 3 figs., 3 tabs.

48966 (INIS-mf—10174, pp IX/39) **Long-term cosmic ray variations - present status.** Emrich, P.; Masarik, J.; Povinec, P. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48967 (INIS-mf—10174, pp X/40) **Long-lived cosmogenic isotopes and some astrophysical phenomena.** Kocharov, G.E.; Blinov, A.V.; Konstantinov, A.N.; Levchenko, V.A. (AN SSSR, Leningrad. Inst. Vysokomolekulyarnykh Soedinenij). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48968 (INIS-mf—10174, pp X/41) **Time-variations of nuclear reactions rate in the earth's atmosphere and cosmic ray intensity during last 400 years obtained using radiocarbon data.** Kocharov, G.E.; Metskhvarishvili, R.Ya. (AN SSSR, Leningrad. Inst. Vysokomolekulyarnykh Soedinenij; Tbilisskij Gosudarstvennyj Univ., USSR). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

48969 **(INIS-mf—10406) Reflection and transmission of polarized light by planetary atmospheres.** Rooij, W.A. de. (Vrije Univ., Amsterdam (Netherlands)). 12 Sep 1985. 262p. NTIS (US Sales Only), PC A12/MF A01. File Number DE86703135.

In this thesis the reflection and transmission of sunlight by planetary atmospheres is studied, taking full account of the polarization of light. The atmospheres are treated as being locally plane-parallel, and are assumed to consist of a number of homogeneous layers, the lowest one being either a ground surface or a semi-infinite homogeneous layer. Includes Dutch summary; 220 refs.; 33 figs.; 33 tabs.

48970 **(INIS-mf—10417) Star clusters and associations. Physics and evolutions of stars.** Ruprecht, J.; Palous, J. (eds.). (Ceskoslovenska Akademie Ved, Prague. Astronomicky Ustav). 1983. 314p. (In English and Russian). (CONF-8309388—). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233.

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

All 33 papers presented at the symposium were inputted to INIS. They dealt with open clusters, globular clusters, stellar associations and moving groups, and local kinematics and galactic structures.

48971 (INIS-mf—10417, pp 2-12) **Structural properties of open star clusters and their relation to the Galaxy.** Ruprecht, J. (Ceskoslovenska Akademie Ved, Prague. Astronomicky Ustav). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

Structural peculiarities of most open star clusters are discussed. They might indicate dynamical influences and disruption of clusters. The distribution of the number of disturbed clusters relatively to the total number of clusters seems to suggest some connection with the distribution of interstellar matter in the sky.

48972 (INIS-mf—10417, pp 28-36) **Age groups and composite diagrams for young open clusters.** Mermilliod, J.-C. (Lausanne Univ., Switzerland). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

Stellar evolution for intermediate mass stars and stellar content of young open clustes are discussed within the framework of the age group concept. The composite colour-magnitude diagrams for 14 age groups, including a total of 75 clusters, form the basis of these investigations. Preliminary results are given of an extensive programme of observing radial velocities of red giants and dwarfs in open clusters aimed at determining membership and binarity as well as orbital elements. Results of a study of the distribution of the projected rotational velocities of red dwarfs in nearby open clusters are also presented.

48973 (INIS-mf—10417, pp 49-59) **Behaviour of brighter binaries and yellow giants in open clusters.** Goetz, W. (Akademie der Wissenschaften der DDR, Sonneberg. Zentralinstitut fuer Astrophysik). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The behaviour is discussed of groups of massive stars in open clusters. The high concentration of binaries and yellow giants toward the centre of open cluster NGC 2632 (Praesepe) is not a singular phenomenon. It can be found in the Hyades and in the Coma-Berenices cluster, which are nearly of equal age, but not in younger and older objects. This phenomenon depending on the mean mass of a star group, its evolutionary phase, the mean age of the cluster and the time of star formation within it, can be explained by the diagram of the evolution of star clusters, i.e., by cosmogonic reasons. It is not caused by gravitational effects.

48974 (INIS-mf—10417, pp 60-65) **Collective effects in the rotation of stars in clusters and associations.** Zhilyaev, B.E.; Marchenko, S.V. (AN Ukrainskoj SSR, Kiev. Glavnaya Astronomicheskaya Observatoriya). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

14 star clusters and associations were selected for the analysis. The selection included stars of the same spectral type within the range of two to three spectral sub-types. For comparing the characteristics of rotation a random selection was made of stars from the galactic field. The comparison was based on statistical criteria using

distribution functions. The distribution functions are given for star clusters M39 (A0 V-A2 V), interval B0 V-F3 V the cluster stars and the field have a statistically equivalent dispersion of rotation velocity. A comparison is made of rotation velocities of the western and eastern parts of the Orion 1 association. It was found that in the star cluster α Persei in the interval B8 V-A2 V and in the Pleiades in the interval F2 V-F6 V the stars in the core have a higher rotation than stars on the periphery.

48975 (INIS-mf—10417, pp 66-68) **Search for possible members of open clusters among known Ap stars.** Zelwanowa, E.; Popova, M. (Akademie der Wissenschaften der DDR, Potsdam. Zentralinstitut fuer Astrophysik; Bylgarska Akademiya na Naukite, Sofia). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

48976 (INIS-mf—10417, pp 69-79) **Present state of the international star cluster photometry programme.** Szecsenyi-Nagy, G. (Eoetvoes Lorand Tudomanyegyetem, Budapest, Hungary). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

In the seventies, astronomers from some European socialist countries, participating in the multilateral cooperation of the academies of these states, decided to collaborate in a detailed astrometric, photometric and spectroscopic investigation of open star clusters. Hungarian scientists were expected to carry out multicolour photometry of open cluster stars. Considering that the majority of selected stars are far too dim to be measured by the moderate-sized photoelectric telescope of the Hungarian Academy of Sciences and that individual photoelectric photometry of cluster members would be extremely time-consuming, photographic UBV photometry was chosen as the most advantageous solution. The first steps in this task were taken - more than 200 plates were collected in these spectral bands - and a short review is presented on the observations in order to inform the cooperating partners. At the same time, a proposal is made to supplement the list of jointly studied open clusters, and information is requested from collaborators in the other countries on cluster membership probabilities and spectra of stars in order to take the preliminary steps in laboratory measurements.

48977 (INIS-mf—10417, pp 80-87) **Lund catalogue of open cluster parameters.** Lyngaa, G. (Lund Observatory, Sweden). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The catalogue is computer-based and issued in collaboration with the CDS in Strasbourg. The outlay of the catalogue is described, particularly the tracer system for data base handling. A new examination of cluster appearances on survey charts was entered in the 1983 edition. Various parameters are compared and their accuracy discussed.

48978 (INIS-mf—10417, pp 89-102) **Collective processes in the formation of star clusters.** Polyachenko, V.L. (AN SSSR, Moscow. Astronomicheskij Sovet). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The stability problem is solved for spherical collisionless systems with different degrees of star distribution anisotropy in the velocity space. It is shown that the development of an instability in systems of stars with highly eccentric orbits may lead to a distinct elliptical deformation.

48979 (INIS-mf—10417, pp 103-114) **Binaries and evolution of globular clusters.** Stodolkiewicz, J.S. (Polska Akademia Nauk, Warsaw. Centrum Astronomiczne). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The influence of binaries on the evolution of globular clusters is studied numerically using the Monte Carlo method. It is assumed that initially the stellar systems are composed of single stars only and binaries are born (as a result of three-body encounters) during the evolution of the clusters. The life of each hard binary in the cluster is studied individually. It is shown that the first binaries appear long before core collapse is completed and then a population of a few hard binaries remains in the cluster during its whole life. Practically all energetic binary-single star interactions take place in the deep, internal parts of the core, populated mostly by the heaviest stars of the cluster. The binary-single star interactions become a source of energy which stops the collapse of the core and causes expansion and gradual disintegration of the whole cluster during the post-collapse phase.

48980 (INIS-mf—10417, pp 119-140) **Investigation of central parts of globular clusters, performed in Pulkovo.** Kadla, Z.I.; Gerashchenko, A.N. (Glavnaya Astronomicheskaya Observatoriya AN SSSR, Pulkovo, USSR). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The Pulkovo refracting telescope was used to image on photographic plates the V system magnitudes of associations NGC 5272, 5904, 6205, 6341 and 7078. The telescope at the Ondrejov observatory was used for a detailed investigation of the central parts of these associations. The best resolution of the central part was found for the NGC 6205 association. The authors also deal with the probability of the occurrence of variable stars of the RR Lyrae type. Classification into sub-types IIA, IIB and IA is presented. Period-amplitude diagrams are discussed as is the doubly ionized helium zone.

48981 (INIS-mf—10417, pp 141-144) **Brightness distribution in globular clusters derived by the narrow-slit scanning method.** Mironov, A.V.; Rastorguev, A.S.; Naumova, E.V. (AN SSSR, Moscow. Astronomicheskij Sovet; Leningradskij Gosudarstvennyj Univ., USSR). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

Preliminary results of observations of 11 globular clusters made with the aid of a narrow long slit are presented. The photometric profiles were recorded directly in the operational store of a computer, with the telescope stopped in its motion about the polar axis. The photometric profiles obtained were compared with King's models and with the generalized isochronous model. The finite length and width of the slit were considered. The theoretical brightness distribution agrees well with observations in the central regions of the clusters at R<or aprox. 3'-5'. The radii of cores and the effective radii were determined. Large-scale fluctuations of density, possibly caused by bright stars or by fluctuations of the abundant galactic background, were observed in clusters M12, M13 and NGC 6712.

48982 (INIS-mf—10417, pp 145-155) **Lessons from the globular cluster NGC 5466.** Brosche, P.; Geffert, M.; Ninkovic, S. (Bonn Univ., Germany, F.R. Sternwarte; Astronomska Opservatorija, Belgrade, Yugoslavia). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

NGC 5466 is a "loose" globular cluster (large core radius) with low metallicity. Its absolute velocity was measured and leads to perigalactic distances around 6 kpc. The value of the observed "tidal radius" is clearly too large in comparison with the theoretical value.

48983 (INIS-mf—10417, pp 156-160) **Galactic orbits of globular clusters.** Rastorguev, A.S.; Surdin, V.G. (AN SSSR, Moscow. Astronomicheskij Sovet). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

Perigalactic distance R/sub p/, eccentricity e/sub min/ and the mean square error of e/sub min/ were calculated for 108 globular clusters. The distribution of R/sub p/ and e/sub min/ in the given set of clusters is presented graphically. The obtained values of R/sub p/ are compared with values obtained by Peterson.

48984 (INIS-mf—10417, pp 161-166) **Fate of globular clusters.** Surdin, V.G. (Moskovskij Gosudarstvennyj Univ., USSR. Gosudarstvennyj Astronomicheskij Inst. "GAISh"). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The evolution of globular clusters under dissipation and dynamical friction is considered. It is shown that a gravothermal catastrophe in the cluster core will take place before the cluster is completely destroyed under dissipation or falls into the Galactic centre under dynamical friction. The objects which are formed in the cluster-core contraction process (massive black holes or close binaries) also fall into the centre of the Galaxy or populate its bulge.

48985 (INIS-mf—10417, pp 168-187) **Dynamical evolution of the environment of an OB association.** Tenorio-Tagle, G. (Max-Planck-Institut fuer Physik und Astrophysik, Garching, Germany, F.R. Inst. fuer Astrophysik). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The physical conditions are reviewed of a large variety of structures such as giant HII regions, holes, shells and rings, present in the interstellar medium. Such structures are thought to result from the energy input from OB associations in the form of ionizing radiation, strong stellar winds and supernova explosions. A study of the effects produced by every single energy source is proposed as a way to evaluate, understand, and relate the observed structures to a given energy input. In particular, predictions from the study of the HII region evolution around a stellar association are reviewed. Such an evolution lasting 10^7yr accounts for the aging of the exciting stars. The resulting effects are then compared with the large (expanding and static) shells observed in our Galaxy, and with alternative theoretical models. A sequence of events based on the observed properties and the theoretical models is proposed as a likely scenario for the evolution of the environment of an OB association.

48986 (INIS-mf—10417, pp 188-199) **Dust distribution in the Rosette nebula and MON OB2 association region.** Guseva, N.G. (AN Ukrainskoj SSR, Kiev. Glavnaya Astronomicheskaya Observatoriya). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

A detailed study was made of the distribution of dust matter within a radius of 30′ from the centre of open cluster NGC 2244 which is the centre of star association MON OB2 and in the surroundings of emission nebula "Rosette". The author's own catalog was used of star magnitudes B and V and spectral types of more than 2000 stars of the O-A-B type to 13.0/sup m/ on an area of 19 quadratic degrees centred in star cluster NGC 2244. Also used were Ogura's UBV photometric data and proper star motions after van Alten. Absorption measurements using indices E/sub B-V/ helped to identify a more complex spatial arrangement of the dust cloud than was previously assumed.

48987 (INIS-mf—10417, pp 200-211) **Non-stable motions and instability in stellar associations.** Mirzoyan, L.V. (AN Armyanskoj SSR, Byurakan. Astrofizicheskaya Observatoriya). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The results are discussed of investigations carried out since the discovery of stellar associations. It is shown that both proper motions, provided they have been accurately determined, and radial velocities of stars in the associations indicate the expansion and subsequent disintegration of stellar associations. Results concerning multiple systems of the Trapezium type, which occur almost exclusively in associations as their cores, are discussed separately. Statistical investigations and investigations of their dynamic evolution by means of a computer, have brought evidence of the dynamic instability of these systems. An analysis of the proper motions of cores of Herbig-Haro objects entering associations, also indicates non-stationary (disintegrating) motions associated with evolution. The expansion and disintegration of stellar associations and Trapezium-type systems, the receding of Herbig-Haro objects from parental T-Tauri type stars characterize the continuous diminishing of mass density, i.e., the disintegration and dispersion of matter. This is also brought out by observations of flow or emission processes of matter from many young stars (of the R Cygni, Wolf-Rayet, Be, T Tauri, etc. types). Recently, evidence was obtained of considerable mass loss of OB stars. Finally, the results of radio-astronomical observations of diffuse matter and cosmic masers have also indicated expansive motions. Results of various observations of existing stellar associations made it possible to draw the conclusion that the trend of evolutionary processes in the present Galaxy corresponds to the disintegration and dispersion of matter, at least in the early stages of evolution.

48988 (INIS-mf—10417, pp 212-217) **Proper motions and kinematical properties of Orion Trapezium type stellar systems.** Yatsenko, A.I. (AN Ukrainskoj SSR, Kiev. Glavnaya Astronomicheskaya Observatoriya). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The study of the evolution and stability of star associations should involve the study of internal motion in the cores of associations, in particular of multiple stellar systems of the Orion Trapezium type. On the basis of information on proper motion in a number of systems of the Orion Trapezium type given in three stellar catalogues, it was found that the kinematics of these systems does not in effect differ from the kinematics of single stars of spectral types BI-BII. The dispersion of internal relative velocities of the trapezium components is about 2.5 times less than the dispersion of peculiar velocities of B-type stars; this proves the existence of a genetic relationship between the trapezium stars. The dispersion of velocities of internal motion of components of the trapezium is approximately +- 5 km/s.

48989 (INIS-mf—10417, pp 218-231) **On the most probable number of flare stars in the Pleiades field.** Szecsenyi-Nagy, G. (Eoetvoes Lorand Tudomanyegyetem, Budapest, Hungary). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

In order to observe flare stars of nearby open clusters and star associations, astronomers of many countries employ the same method. This method of photographic photometry by wide-field telescopes is only partly standardized. Differences in the various

steps of the method, in the fields of view of the telescopes and in sky brightness of the observatories participating in the common work can make the statistical evaluation of the results more difficult and can lead to delusive conclusions. A critical evaluation of the problematic points of the observations and reports is given. Statistical results of flare star observations in the Pleiades field made during the past two decades are summarized. It is shown that the estimated number of flare stars in the region observed as published by scientists of the Byurakan Astrophysical Observatory is too low. A model of the flare star system of the field is presented. It is composed of seven differently populated subsystems with various mean flare frequencies. The strength of this model is shown on the basis of the photographic observations of the last decade. The total number of flare stars in the Pleiades field is estimated to be higher than 2500 and the expected number of flare-up observations in order to discover all of them is given (nearly 23000).

48990 (INIS-mf—10417, pp 232-239) **Hyades moving group.** Bubenicek, J.; Palous, J. (Karlova Univ., Prague, Czechoslovakia. Fakulta Matematicko-Fyzikalni; Ceskoslovenska Akademie Ved, Prague. Astronomicky Ustav). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The motion of A stars from a new catalogue of space velocity vectors is analyzed. Stars moving almost in parallel with the Hyades open star cluster, i.e., members of Eggen's Hyades moving group were rediscovered. The proper motions of A stars were independently investigated using the convergent point method. A list of A-star moving group members was compiled. The shape and age distribution of this stellar group is discussed.

48991 (INIS-mf—10417, pp 240) **Evolution of a sparse stellar system.** Hadrava, P. (Ceskoslovenska Akademie Ved, Ondrejov. Astronomicky Ustav). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

48992 (INIS-mf—10417, pp 241) **Fragmentation of molecular clouds and the IMF.** Vanysek, V. (Karlova Univ., Prague, Czechoslovakia. Fakulta Matematicko-Fyzikalni). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

48993 (INIS-mf—10417, pp 242-252) **Effect of stellar luminosity and temperature calibration on determination of initial mass function.** Myakutin, V.I. (AN SSSR, Moscow. Astronomicheskij Sovet). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The initial mass function for association Orion OB was made up from data obtained by uvbyβ-photometry and MK spectral classification. B-type stars were chosen for analysis. A comparison was made of luminosity and effective temperature of stars obtained using both methods. It was found that small differences in calibration of uvbyβ-photometry and MK spectral classification lead to significant differences in the mass of B-type stars.

48994 (INIS-mf—10417, pp 253-254) **Nitrogen content in atmospheres of late giants determined from NH molecular bands in UV spectral range.** Shavrina, A.V. (AN Ukrainskoj SSR, Kiev. Glavnaya Astronomicheskaya Observatoriya). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

48995 (INIS-mf—10417, pp 256-257) **Velocity-age relation for B and A stars.** Palous, J.; Piskunov, A.E. (Ceskoslovenska Akademie Ved, Prague. Astronomicky Ustav; AN SSSR, Moscow. Astronomicheskij Sovet). 1983. (In English and Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

48996 (INIS-mf—10417, pp 262-279) **Excitation of spiral patterns in responsive density wave theory.** Thielheim, K.O. (Kiel Univ., Germany, F.R. Inst. fuer Reine und Angewandte Kernphysik). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The present state of research into the generation of spiral patterns in the responsive density wave theory is discussed. The latter is based on a conjecture of symmetry breaking in the equations of motion of stellar orbits in differentially rotating stellar disks by an oval perturbation growing with time. Analytical approaches based on first-order epicyclic approximation as well as computer experiments are performed to investigate the consequences of this working hypothesis.

48997 (INIS-mf—10417, pp 287-291) **Kinematics of B and A stars.** Palous, J. (Ceskoslovenska Akademie Ved, Prague. Astronomicky Ustav). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The A, B, C and K "constants" are estimated in the vicinity of the Sun from the gradients of U, V linear velocity components in the X, Y plane. Differences were found between very young (age$<5 \times 10^7$ years) and medium-old (age2×10^8 years) stars. Noncircular motions of the very young stars are interpreted as the result of expansion of the local system.

48998 (INIS-mf—10417, pp 292-301) **Open star clusters and the structure of the galactic disk.** Lyngaa, G. (Lund Observatory, Sweden). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

Open star clusters are in many respects the best objects to observe if one wants to study the structure and evolution of the galactic disk. Distances, ages and element abundances can all be relatively well determined for these objects. Relevant data are discussed and different conclusions examined regarding abundance and age gradients in the disk. These disk properties are related to existing models for galactic evolution.

48999 (INIS-mf—10417, pp 14-27) **On the scale of distances of the Galaxy based on the study of the open star-cluster subsystem.** Barkhatova, K.A.; Pylskaya, O.P. (Ural'skij Gosudarstvennyj Univ., Sverdlovsk, USSR). 1983. (In Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The distribution of open clusters in the Galaxy plane is studied using recent data. It is shown that clusters tend to be localized in Galactic longitudes 120deg-300deg which coincide with the direction of Magellanic Clouds and Magellanic Stream. Two age pe-

culiarities of the spatial distribution of open clusters are given. The dependence of linear diameters on the distance from the Galaxy centre is discussed. The necessity is suggested of correcting parameters of the zero-age main sequence for objects of early spectral classes, and of interstellar absorption.

49000 (INIS-mf—10417, pp 37-48) **Galactic distribution of open clusters of different ages and the angular velocity of the spiral structure.** Balazs, B.A.; Lynga, G. (Konkoly Observatory, Hungary; Lund Observatory, Sweden). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

Results are presented based on the galactic distribution of open clusters of various ages. The shape and angular velocity of the spiral pattern is discussed on the basis of this distribution. The results suggest that 1. we might be forced to scale down our whole Galaxy, accepting R/sub Sun/=7 kpc as the galactocentric distance of the Sun; 2. the angular speed of the pattern lies somewhere between 33 and 36 km s^{-1}/kpc (or between 23 and 25 if R/sub Sun/=10 kpc); accordingly the location of the Sun is close to the so called co-rotation circle and, therefore, the galactic position of our solar system is an exclusive one; 3. the spiral pattern seems to be compatible with "long density waves", consequently the source of the wave energy should apparently be looked for in the central regions of our Galaxy.

49001 (INIS-mf—10417, pp 115-118) **Evolution of globular clusters.** Surdin, V.G. (Moskovskij Gosudarstvennyj Univ., USSR. Gosudarstvennyj Astronomicheskij Inst. "GAISh"). 1983. (In English and Russian). NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

49002 (INIS-mf—10417, pp 258-261) **Stability of stellar disk and ratio of halo to disk masses in the Galaxy.** Morozov, A.G. (Voronezhskij Gosudarstvennyj Univ., USSR). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The criterion is presented of local stability of a non-homogeneous stellar disk of finite thickness with regard to non-axisymmetric perturbations. The criterion was verified by a numerical experiment, and it was found that Caldwell and Ostriker's galactic model meets this criterion.

49003 (INIS-mf—10417, pp 280-286) **Local galactic kinematics.** Lindblad, P.O.; Westin, T.; Zentelis, N.; Loden, K. (Stockholm Observatory, Sweden). 1983. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703233. (CONF-8309388—).

From Symposium on star clusters and associations and their relation to the evolution of the galaxy; Prague, Czechoslovakia (27 Sep 1983).

The distribution of bright stars is shown. In the x, z plane are recorded the positions of stars younger than 3 x 10^7 years, with V<6.sup(sm)5. The positive x axis is oriented towards the galactic anticentre and the z axis to the north galactic pole. The Gould Belt system has an inclination of 20° to the galactic plane. Graphically presented are components of stellar velocity in the direction of the galactic anticentre for stars younger than 3 x 10^7 years as a function of distance. Olano's model for local interstellar hydrogen is described.

49004 (LA-UR—86-2350) **Smooth particle hydrodynamics: theory and application to the origin of the moon.** Benz, W. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 9p. (CONF-8606175—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013854.

From Workshop on the use of supercomputers in stellar dynamics; Princeton, NJ, USA (2 Jun 1986).

The origin of the moon is modeled by the so-called smooth particle hydrodynamics (SPH) method (Lucy, 1977, Monaghan 1985) which substitutes to the fluid a finite set of extended particles, the hydrodynamics equations reduce to the equation of motion of individual particles. These equations of motion differ only from the standard gravitational N-body problem insofar that pressure gradients and viscosity terms have to be added to the gradient of the potential to derive the forces between the particles. The numerical tools developed for "classical" N-body problems can therefore be readily applied to solve 3 dimensional hydroynamical problems. 12 refs., 1 fig.

49005 (N—86-25307) **International Ultraviolet Explorer atlas of O-type spectra from 1200 to 1900 angstrom.** Walborn, N.R.; Nichols-Bohlin, J.; Panek, R.J. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Dec 1985. 153p. (NASA-RP—1155). NTIS, PC A08/MF A01.

The IUE archives provide an unprecedented sample of uniform, high-quality ultraviolet stellar spectra. In particular, they contain high-resolution SWP data for nearly 200 different O stars. We have undertaken a survey of the 1200-1900 A region in about 120 of them having homogeneous optical spectral classifications to investigate systematically the behavior of the ultraviolet features, incuding the prominent stellar wind profiles and the degree to which they correlate with the optical types. The standard extracted spectrograms have been rebinned to a constant wavelength resolution of 0.25A and uniformly normalized (not dereddened) at the GSFC RDAF. They are then plotted at 10A/cm, with reseau, photometric quality and echelle order junction flags available. This atlas contains such plots for about 100 stars, arranged in spectral-type, luminosity and peculiar object sequences. The results show a high degree of correlation between the ultraviolet features, both photospheric and stellar-wind, and the optical classifications for the majority of the O-type stars.

49006 (N—86-25316) **Possible importance of synchrotron/inverse Compton losses to explain fast mm-wave and hard x-ray emission of a solar event.** Correia, E.; Kaufmann, P.; Costa, J.E.R.; Vaz, A.M.Z.; Dennis, B.R. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Feb 1986. 11p. (NASA-TM—88659; INPE—3809-PRE/895; CONF-8509317—1). NTIS, PC A02/MF A01.

From SMM topical workshop on rapid fluctuations in solar flares; Lanham, MD, USA (30 Sep 1985).

The solar burst of 21 May 1984 presented a number of unique features. The time profile consisted of seven major structures (seconds), with a turnover frequency or approx. 90 GHz, well correlated in time to hard x-ray emission. Each structure consisted of multiple fast pulses (.1 seconds), which were analyzed in detail. A proportionality between the repetition rate of the pulses and the burst fluxes at 90 GHz and or approx. 100 keV hard x-rays, and an inverse proportionality between repetition rates and hard x-ray power law indices have been found. A synchrotron/inverse Compton model has been applied to explain the emission of the fast burst structures, which appear to be possible for the first three or four structures.

49007 (N—86-26263) **Search for metal lines in the spectra of DA white dwarfs. Semiannual Report, 1 October 1984-31 March 1985.** Wegner, G.A. (Dartmouth Coll., Hanover, NH (USA)). Jun 1986. 22p. (NASA-CR—176825). NTIS, PC A02/MF A01.

A theoretical analysis was carried out in order to interpret the ultraviolet spectra of DB white dwarfs obtained earlier with the International Ultraviolet Explorer (IUE) satellite. Here the results of the IUE ultraviolet spectroscopy combined with visual data and model atmospheres of DB white dwarfs are reported. In particular, a search for spectra lines due to the element carbon using the ultraviolet was made. In no case is there a positive detection of carbon and from these data, and upper limits for carbon by number relative to helium are derived in the range of C: He 10 to the minus 5 power to 10 to the minus 7 power for the 16 DB stars with ultra-

violet spectra in the temperature range 11400 K T/sub EFF/ less than 2300 K. The low carbon abundances found in the atmospheres of the DB stars agree well with the hypothesis that the atmospheric carbon observed in the cooler DQ members of the helium-rich white dwarf sequence is produced by a convective dredging mechanism.

49008 **(N—86-26266) Highly ionized atoms in cooling gas.** Edgar, R.J.; Chevalier, R.A. (Virginia Univ., Charlottesville (USA)). 1986. 16p. (NASA-CR—176819). NTIS, PC A02/MF A01.

The ionization of low density gas cooling from a high temperature was calculated. The evolution during the cooling is assumed to be isochoric, isobaric, or a combination of these cases. The calculations are used to predict the column densities and ultraviolet line luminosities of highly ionized atoms in cooling gas. In a model for cooling of a hot galactic corona, it is shown that the observed value of N(N V) can be produced in the cooling gas, while the predicted value of N(Si IV) falls short of the observed value by a factor of about 5. The same model predicts fluxes of ultraviolet emission lines that are a factor of 10 lower than the claimed detections of Feldman, Brune, and Henry. Predictions are made for ultraviolet lines in cooling flows in early-type galaxies and clusters of galaxies. It is shown that the column densities of interest vary over a fairly narrow range, while the emission line luminosities are simply proportional to the mass inflow rate.

49009 **(N—86-26270) Investigation of the energy balance of solar active regions using the ACRIM irradiance data. Final Report.** Petro, L.D. (Atmospheric and Environmental Research, Inc., Cambridge, MA (USA)). Feb 1986. 82p. (NASA-CR—176788). NTIS, PC A05/MF A01.

The detection of a significant correlation between the solar irradiance, corrected for flux deficit due to sunspots, and both the 205 nm flux and a photometric facular index were examined. A detailed analysis supports facular emission as the more likely source of correlation with the corrected radiance, rather then the error in sunspot correction. A computer program which simulates two dimensional convection in a compressible, stratified medium was investigated. Subroutines to calculate ionization and other thermodynamic variables were also completed.

49010 **(PB—86-196086/XAB) Solar-Geophysical Data Number 499, March 1986. Part 1 (prompt reports). Data for February 1986, January 1986, and late data.** Coffey, H.E. (National Geophysical Data Center, Boulder, CO (USA)). Mar 1986. 175p. (SGD—499-PT-1). NTIS, PC A08/MF A01.

Contents include: Detailed index for 1985-86; Data for February 1986-- (IUWDS alert periods (Advance and worldwide), Solar-activity indices, Solar flares, Solar radio emission, Vostok inferred interplanetary magnetic field polarity, Stanford mean solar magnetic field); Data for January 1986--(Solar-active regions, Sudden ionospheric disturbances, Solar radio spectral observations, Cosmic-ray measurements by neutron monitor, Geomagnetic indices, Radio-propagation indices); Late data-(Solar-active regions, Solar radio-spectral observations, Culgoora, Cosmic-ray measurements by neutron monitor, Calcium plage data).

49011 **(PB—86-196094/XAB) Solar-Geophysical Data Number 499, March 1986. Part 2 (comprehensive reports). Data for September 1985, and miscellanea.** Coffey, H.E. (National Geophysical Data Center, Boulder, CO (USA)). Mar 1986. 36p. (SGD—499-PT-2). NTIS, PC A03/MF A01.

Contents: Detailed index for 1985-86; Data for September 1985-- (Solar flares, Solar radio bursts at fixed frequencies; Solar x-ray radiation from GOES satellite; Mass ejections from the sun; Active prominences and filaments); (Meudon carte synoptique 7 July - 26 September 1985, Solar irradiance).

49012 **(PB—86-196102/XAB) Solar-Geophysical Data Number 499, March 1986. Supplement.** (National Geophysical Data Center, Boulder, CO (USA)). Mar 1986. 87p. (SGD—499-SUPPL). NTIS, PC A05/MF A01.

The supplement contains the description and explanation of the data in the monthly publication Solar-Geophysical Data, compiled by the National Geophysical Data Center (NGDC) in Boulder, CO USA. Solar-Geophysical Data is intended to keep research workers informed on a timely schedule of the major events of solar activity and the associated interplanetary, ionospheric, radio propagation, and other geophysical effects.

49013 **(RRK—85-12) Geodesic bi-scalars in some isotropic universes.** Nariai, Hidekazu. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Apr 1985. 10p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703136.

A general formula for the geodesic bi-scalars in the Robertson-Walker universes with flat 3-space is derived, together with that for the bi-scalar Green's function corresponding to the 4-dimensional commutation function for a quantized scalar field. In terms of that formula, several explicit expressions for the geodesic bi-scalar are obtained.

49014 **Microwave-background anisotropy and decaying-cold-particle scenarios.** Kolb, E.W.; Olive, K.A.; Vittorio, N. (Theoretical Astrophysics Group, Fermi National Accelerator Laboratory, Batavia, Illinois 60510). **34**: No. 4, 940-943(15 Aug 1986). Contract AC02-83ER40105.

Decaying-particle scenarios for galaxy formation are subject to constraints from limits on the anisotropy of the microwave-background radiation. In this paper we obtain limits on the properties of decaying cold dark matter.

49015 **Equivalence of active and passive gravitational mass using the moon.** Bartlett, D.F.; Van Buren, D. (Department of Physics, University of Colorado, Boulder, Colorado 80309). **57**: No. 1, 21-24(7 Jul 1986).

A limit is established for the violation of the equality of passive and active gravitational mass. Our test is based on an asymmetry in the composition of the moon. We hypothesize that the 2-km offset between the moon's center of figure and center of mass indicates an asymmetry in the distribution of Fe and Al. Unless the Fe on one side and the Al on the other attract each other with the same force, the moon will not be in the orbit predicted by classical mechanics. Using the results from laser ranging and a model for the moon's interior we find that the ratios of active to passive mass for Fe and Al are the same to a precision of 4 x 10/sup -12/.

49016 **Statistics of peaks of Gaussian random fields.** Bardeen, J.M.; Bond, J.R.; Kaiser, N.; Szalay, A.S. (Washington Univ., Seattle; Stanford Univ., CA; California Univ., Berkeley; Cambridge Univ., England; Fermi National Accelerator Lab., Batavia, IL). *Astrophysical Journal;* **304**: 15-61(May 1986).

A set of new mathematical results on the theory of Gaussian random fields is presented, and the application of such calculations in cosmology to treat questions of structure formation from small-amplitude initial density fluctuations is addressed. The point process equation is discussed, giving the general formula for the average number density of peaks. The problem of the proper conditional probability constraints appropriate to maxima are examined using a one-dimensional illustration. The average density of maxima of a general three-dimensional Gaussian field is calculated as a function of heights of the maxima, and the average density of upcrossing points on density contour surfaces is computed. The number density of peaks subject to the constraint that the large-scale density field be fixed is determined and used to discuss the segregation of high peaks from the underlying mass distribution. The machinery to calculate n-point peak-peak correlation functions is determined, as are the shapes of the profiles about maxima. 67 references.

49017 **Search for scattered X-ray halos around variable sources - the X-ray halo of Cygnus X-1.** Bode, M.F.; Priedhorsky, W.C.; Norwell, G.A.; Evans, A. (Manchester Victoria Univ., England; Los Alamos National Lab., NM; Keele Univ,, England). *Astrophysical Journal;* **299**: 845-851(Dec 1985).

The results of a program to search for the presence of halos due to X-ray scattering by interstellar grains in the line-of-sight to variable X-ray sources are reported. As part of this program, four

Einstein HRI images of Cyg X-1 were examined. The analysis technique exploits the intrinsic aperiodic variability of this source to map the point response function of the optics. Any scattered halo present will not reflect short-term central source time variability, since such variability is smoothed by differential time delays of order days. Thus, a residual, nonvariable component to the surface brightness distribution (comprising about 12 percent or more of the source flux) is interpreted as a scattered halo. The Cyg X-1 halo is consistent with those of other sources found in previous studies using different techniques. Comparison is also made with a scattering model and, despite uncertainties in source spectrum and distance, reasonable agreement with the observatons is found using a standard interstellar grain model. The potential of X-ray scattering as a probe of the properties of interstellar grains is demonstrated. 23 references.

49018 **CSSP implementation plan for space plasma physics programs.** Baker, D.N.; Williams, D.J. (Los Alamos National Lab., NM; Johns Hopkins Univ., Laurel, MD). *EOS, Transactions, American Geophysical Union;* **66**: 1217(Dec 1985).

The Committee on Solar and Space Physics (CSSP) has provided NASA with guidance in the areas of solar, heliospheric, magnetospheric, and upper atmospheric research. The budgetary sitation confronted by NASA has called for a prioritized plane for the implementation of solar and space plasma physics programs. CSSP has developed the following recommendations: (1) continue implementation of both the Upper Atmosphere Research Satellite and Solar Optical Telescope programs; (2) initiate the International Solar Terrestrial Physics program; (3) plan for later major free-flying missions and carry out the technology development they require; (4) launch an average of one solar and space physics Explorer per yr beginning in 1990; (5) enhance current Shuttle/Spacelab programs; (6) develop facility-class instrumentation; (7) augment the solar terrestrial theory program by FY 1990; (8) support a compute modeling program; (9) strengthen the research and analysis program; and (10) maintain a stable suborbital program for flexible science objectives in upper atmosphere and space plasma physics.

6402 Atmospheric Physics

REFER ALSO TO CITATION(S) 48968, 49010, 49012, 49078

49019 **(N—86-25070) Morphological study of waves in the thermosphere using DE-2 observations. Final Technical Report.** Gross, S.H.; Kuo, S.P.; Shmoys, J. (Polytechnic Inst. of New York, Farmingdale (USA)). May 1986. 57p. (NASA-CR—176775; POLY-MRI—1451-86). NTIS, PC A04/MF A01.

Theoretical model and data analysis of DE-2 observations for determining the correlation between the neutral wave activity and plasma irregularities have been presented. The relationships between the observed structure of the sources, precipitation and joule heating, and the fluctuations in neutral and plasma parameters are obtained by analyzing two measurements of neutral atmospheric wave activity and plasma irregularities by DE-2 during perigee passes at an altitude on the order of 300 to 350 km over the polar cap. A theoretical model based on thermal nonlinearity (joule heating) to give mode-mode coupling is developed to explore the role of neutral disturbance (winds and gravity waves) on the generation of plasma irregularities.

49020 **Comment on "increase of ion kinetic temperature across a collisionless shock: I. A new concept by L. C. Lee et al." and "Ion acceleration in quasiperpendicular magnetosonic shock waves with subcritical mach number by Y. Ohsawa and J. Sakai".** Winske, D.; Gosling, J.T.; Thomsen, M.F. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Geophysical Research Letters;* **13**: No. 6, 561-562(Jun 1986).

The question of ion heating at subcritical collisionless shocks is reviewed in light of newly proposed mechanisms.

49021 **Electrical changes of the polar ionosphere during magnetospheric substorms.** Ahn, B.H.; Kamide, Y.; Akasofu, S.H. (Department of Earth Science, Teachers College, Kyungpook National University, Taegu, Korea). *Journal of Geophysical Research;* **91**: No. A5, 5737-5754(1 May 1986).

Changes of the distribution of the potential, electric fields, ionospheric currents, field-aligned currents, the Joule heat production rate, the particle energy injection rate and the total energy dissipation rate are examined in detail by comparing them at a presubstorm epoch and the maximum epoch for several substorms on March 17, 18, and 19, 1978. The data sets are obtained on the basis of the magnetic records from the six International Magnetospheric Study meridian chains of observatories by using the computer code developed by Kamide e-italict-italic a-italicl-italic. (1981) and the conductivity model developed by Ahn et al. (1983b). A number of global features that are found to be common to most of the substorms examined in this study include the following: (1) The positive potential cell in the morning sector extends into the evening sector during substorms. (2) When it is intensified, the westward electrojet on the nightside tends to flow equatorward of the positive potential ridge. (3) The so-called "Harang discontinuity" may be identified as the ridge of the negative potential cell. (4) The distribution of field- aligned currents determined by our method is more complicated than the statistical pattern obtained by polar orbiting satellites. (5) The basic ionospheric current pattern is fundamentally the same during a fairly quiet period, a slightly disturbed period and a substorm period. (6) The highest Joule heat production occurs along the westward extension of the westward electrojet, while the particle energy injection rate is high along the westward electrojet in the morning sector.

6403 Atomic, Molecular, And Chemical Physics

REFER ALSO TO CITATION(S) 48088, 49099, 49123, 49219, 49322

49022 **(AERE-R—11796) Controlled removal by ion beam etching of surface contaminant layers on transmission electron microscope specimens.** James, A.W. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Physics and Metallurgy Div.). Oct 1985. 12p. H.M. Stationery Office, London, price Pound 4.00.

The basic principles of transmission electron microscope specimen preparation by ion beam thinning are described. The rate of material removal from stainless steel specimens has been assessed and this information has been used to demonstrate the controlled thinning of a TEM specimen. Three examples where ion beam wiping can be used to remove contaminated surface layers of TEM specimens are given: (i) chlorine-enriched surface regions on stainless steel; (ii) Cu-S rich films on ferritic steels; (iii) oxide films on sintered aluminium. These examples make it clear that ion beam wiping is an essential step in the preparation of some TEM specimens where accurate chemical analysis is required.

49023 (ANL—85-22, pp 158-159) **Geometric treatment of the Stark effect in high Rydberg states of hydrogen.** Peshkin, M.; Vager, Z. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Although the Stark effect in hydrogen has been understood for more than fifty years, an intuitive or geometrical picture appears to have been lacking. The authors have carried out a simple calculation starting from the usual zero-order states in the parabolic basis. For large values of the principal quantum number n, these can be interpreted as elliptical orbits of definite eccentricity and orientation. (More accurately, the use of zero-order wave function swashes out all time dependences at frequencies comparable with the orbital frequencies, so that the current interpretation regards the electron as smeared around its elliptical orbit with each element of the smear moving independently and conserving angular momentum for itself alone.) Now introducing the external electric field causes these orbits to process and pendulate in simply understandable modes, which the authors calculate. The motions may be useful for analysis of experiments in which phenomena such as ori-

entation-dependent ionization play a role. A full report of this work is being prepared for publication.

49024 (ANL—85-22, pp 204) **Barrier to inversion in NF_3.** Berkowitz, J.; Greene, J.P. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Although the photoelectron spectrum of NF_3 had been reported by several previous investigators, none had observed vibrational fine structure in the first band. The authors were able to obtain the fortunate combination of sensitivity and resolution to reveal this vibrational structure. The bifurcated nature of the band was interpreted as a transition from pyramidal NF_3 to pyramidal NF_3^+, the latter having a lower barrier to inversion. The span of the Franck-Condon region in the transition is sufficient to surmount the barrier, whose magnitude can be estimated from the spectrum to be ~0.75 eV. This is one of the very few cases for which an accurate experimental measurement of an inversion barrier is known.

49025 (ANL—85-22, pp 204) **Vibrational autoionization in PF_3: doing violence to the propensity rule.** Berkowitz, J.; Greene, J.P. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The photoionization spectrum of PF_3^+ was measured. In its threshold region, it displays two prominent progressions of autoionization peaks. When these are analyzed, together with earlier photoabsorption studies and photoelectron spectrum, they lead to the conclusion that vibrational autoionization is occurring, with Δ nu $\leqq$ -13. This conclusion stands in sharp contrast with the current theory of vibrational autoionization, which predicts a propensity rule Δ nu = -1. Other examples from the recent literature have been reviewed, and suggest to us that a more general theory of vibrational autoionization is required.

49026 (ANL—85-22, pp 204-205) **Bonding and ionization energies of N-F and P-F compounds.** Berkowitz, J.; Greene, J.P.; Foropoulos, J. Jr.; Neskovic, O.M. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

NF_3, N_2F_4, NF_2, PF_3, P_2F_4, PF_2 and PF_2I have been studied by photoionization mass spectrometry. Modified or confirmatory values have been obtained for the heats of formation of NF_3^+, NF_2^+ and NF^+ and the ionization potentials of NF_3 and NF^2. The step-wise bond energies are deduced to be $D_0°(NF)$ = 3.27 +/- 0.02 eV; $D_0°$(FN-F) 2.85 +/- 002 eV; and $D_0°(F_2N - F)$ = 2.47 +/- 0.01 eV. Heats of formation at 0 K have been measured for PF_3^+ (89.6 +/- 0.5 kcal/mole), PF^+ ($\leqq$ 214.8 kcal/mole) and PF_2I (-142.3 +/- 1.0 kcal/mole). The directly measured ionization potential of PF_2 is 8.85 +/- 0.01 eV. The step-wise bond energies are found to be $D_0°$ (PF) = 4.60 +/- 0.43 eV; $D_0°$ (FP-F) = 5.22 +/- 0.43 eV; and $D_0°$ (F_2P - F) = 5.71 +/- 0.02 eV.

49027 (ANL—85-22, pp 206) **Photoionization of P_2.** Berkowitz, J.; Greene, J.P. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

An attempt was made to generate the radical PF_2 by microwave discharge through PF_3. A weak PF_2 signal was observed (the pyrolysis of P_2F_4 proved to be a more satisfactory source of PF_2) but instead a measurable concentration of P_2 was detected. Numerous autoionization lines were observed, and were found to correlate with certain photoabsorption lines reported earlier. This molecule is of some interest because it is not the normally stable form of phosphorus vapor (P_4 is the stable form above solid phosphorus) and because there is a reversal in the relative stability of electronic ground and first excited states of P_2^+, compared to the isoelectronic N_2^+. In addition to photoabsorption, the photoelectron spectrum had been reported earlier, but not the photoionization spectrum.

49028 (ANL—85-22, pp 207) **Photoionization of SO radical.** Berkowitz, J.; Greene, J.P.; Hagerup, W.A. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The SO radical was generated by microwave discharge through SO_2. A portion of the discharged gas entered the ionization region of the photoionization mass spectrometer, and the photoionization spectrum of SO was obtained in this manner. An accurate ionization potential could be deduced, and considerable autoionization structure was observed. The structure is complex, and does not lend itself to simple analysis.

49029 (ANL—85-22, pp 207) **Photoionization mass spectrometric study of PH_2 and PH_3.** Berkowitz, J.; Greene, J.P.; Gibson, S.T.; Hillhouse, G.L. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The yield of ionic species PH_3^+, PH_2^+ and PH^+, produced by photoionization of PH_3 were studied as a function of wavelength. In a separate experiment, the free radical PH_2 was generated by pyrolysis of benzylphosphine, and its photoionization spectrum was obtained in situ. From an analysis of the results, the authors have deduced the step-wise bond energies upon adding H atoms to P, the respective ionization potentials, and the $^3B_1$ - $^1A_1$ separation in PH_2^+. The latter conclusion is noteworthy because the relative stability of triplet and singlet is reversed from the ordering in the first row isoelectronic species CH_2 and NH_2^+.

49030 (ANL—85-22, pp 209) **Spin-rotation and hfs constants for the X $^2\Sigma^+$ and B $^2\Sigma^+$ states of CaI.** Childs, W.J.; Goodman, G.L.; Goodman, L.S.; Pfeufer, V. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The molecular-beam, laser-rf double-resonance technique was used to study the spin-rotation and hyperfine interactions in the X $^2\Sigma^+$ electronic ground state of the CaI molecular radical. The strengths of these interactions, including their dependences on the vibrational and rotational quantum numbers, were precisely measured. The ground-state observations were then supplemented by measurements of the hfs in the optical B $\rightleftharpoons$ X transitions so that the spin-rotation and hfs interactions in the excited B $^2\Sigma^+$ state could be evaluated. This work was published in J. Mol Spectrosc. 107, 94 (1984).

49031 (ANL—85-22, pp 209-210) **Molecular-orbital model of alkaline-earth monohalide electronic structure.** Goodman, G.L. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have now obtained precise values for the spin-rotation and hfs interaction strengths (both magnetic-dipole and electric-quadrupole) in the four calcium monohalide radicals CaF, CaCl, CaBr, and CaI, When the dependence on nuclear structure is divided out one finds a smooth monotonic dependence for each interaction as one proceeds from lightest (CaF) to heaviest (CaI) halide. A molecular-orbital model is constructed by placing the electrons in progressively less stable orbits until the structure is completed and the hfs is calculated and compared with experimental values.

49032 (ANL—85-22, pp 211) **Dependence of CaF electric-dipole moment on vibrational state.** Childs, W.J.; Goodman, L.S. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A measurement last year of the electric-dipole moment of the X $^2\Sigma^+$ state of CaF in its vibrational ground state (v = 0) was supplemented by corresponding data for the v = 1 state. The tran-

sition N, J, F = 2, 2.5, 3 ⇌ 2, 1.5, 2, previously studied in the v = 0 manifold, was measured for v = 1 in a homogeneous d.c. electric field to determine the Stark splitting. By selecting a particular Stark component of the line and switching the apparatus repetitively between the component for v = 1 and v = 0, the authors were able to measure accurately the v-dependence of the Stark shift. The resulting shift is much larger than was just reported for CaCl. The interpretation is not yet complete.

49033 (ANL—85-22, pp 211-212) **Semi-empirical Sternheimer shielding factors for the atomic 4f and 5d shells.** Childs, W.J.; Cheng, K.T. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In a recent study of $^{+}$-mesic atom hfs, Tanada et al. made precise measurements of the electric-quadrupole moments of several nuclei. They then combined this information with published atomic many-electron hfs studies to obtain Sternheimer shielding factors for the relevant electron shells. The very large scatter in the values found appeared to arise from the widely different methods used by the atomic hfs experimenters in interpreting their data. The authors have succeeded in reducing this scatter very substantially by using a consistent configuration-average Dirac-Fock method for evaluating all the hfs radial integrals, and by reexamining the various assumptions made in analyzing the existing hfs data. The scope was expanded to include all nuclei for which dependable quadrupole moment values (from $^{+}$-mesic atom hfs or Coulomb-excitation methods) and atomic hfs measurements are available.

49034 (ANL—85-22, pp 213) **Ab initio calculation of 4f/sup N/6s^2 hyperfine structure in neutral rare-earth atoms.** Cheng, K.T.; Childs, W.J. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The multi-configuration Dirac-Fock (MCDF) method is used to calculate excitation energies, Lande g-values, and hyperfine-structure constants for low levels of 4f/sup N/6s^2 configurations in the neutral rare-earth atoms. Although no adjustable parameters are used, the results are in rather good agreement with experiment.

49035 (ANL—85-22, pp 215-216) **Lamb shifts and fine structures on n = 2 in helium-like ions.** Berry, H.G.; Engstroem, L.; Hardis, J.E.; Livingston, A.E.; Zei, D.; Somerville, L.P.; Ray, W.J.; Young, L. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Measurements have been made on foil-excited titanium and nickel beams at the Tandem-Linac. The titanium results from several runs at the Argonne Linac have yielded a measurement of the 2s-2p(J=2) transition which is in excellent agreement with the latest calculations. Nickel spectra obtained with 365-MeV nickel beams showed many new yrast transitions in 4- and more electron nickel ions, but the presently available Linac beams are too low in energy to permit the study of the 2-electron spectrum in any detail. Measurements in the same transitions (J=0, 1, 2) in neon have been completed and are being analyzed.

49036 (ANL—85-22, pp 216) **High-spin states in neon.** Hardis, J.E.; Livingston, A.E.; Curtis, L.J.; Berry, H.G. (Univ. of Chicago, IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have followed up their previous measurements in doubly-excited systems of ions of three and four electrons. They have completed precision measurements of the quartet $1s2s2p\ ^4P$ - $^{1s2}p^2\ ^4P$ and quintet $1s2s2p^2\ ^5P$ - $1s2p^3\ ^5S$ transitions of three- and four-electron neon respectively. The authors were able to use 8-MeV doubly-charged ions from the Dynamitron for these experiments. The wavelengths, fine structure, and lifetimes have been compared with several new relativistic theories. They agree reasonably well, particularly with the correlated relativistic Hartree-Fock calculations of Cheng and other recent, relativistic many-body calculations.

49037 (ANL—85-22, pp 216) **Optical measurements of molecular-ion fragmentation.** Berry, H.G.; Engstrom, L.; Huldt, S.; Martinson I.; Curtis, L.J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have previously made measurements in Lund, Sweden of the excitation functions of excited states in ionized carbon and nitrogen, following breakup of CN^{+} in a thin carbon foil. The results show the effect of a neighboring ion on the production of excited states is sensitive to the excitation energy. The measurements were made with very thin carbon foils and up to 6-MeV CN^{+} ion beams. During a visit of Indrek Martinson and Larry Curtis, the authors made further measurements on the light emitted following breakup of N_2^{+} and CH/sub n/$^{+}$ projectiles in very thin carbon foils at Dynamitron energies. The most interesting aspect of this work was the strong variation in the yields of hydrogen Lyman α light as functions both of carbon foil thickness, and of the number n of hydrogen atoms on the initial molecule. A preliminary model explaining these results is being developed.

49038 (ANL—85-22, pp 217) **Mean life measurements in fluorine.** Berry, H.G.; Somerville, L.P.; Young, L.; Ray, W.J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Berkowitz and Ruscic (see Ann Report 1983) have suggested the possible use of a high-lying excited state in neutral fluorine as a candidate for a UV laser source. This level lies above the first ionization limit and decays partly by autoionization and partly by photoemission. The authors have used the beam-foil technique to measure its decay lifetime through observations on the photon decay mode. Several other lifetimes were measured in neutral and singly-ionized fluorine and neon. In particular, the authors measured the same transition in isoelectronic neon.

49039 (ANL—85-22, pp 217-218) **Alignment and orientation production in hydrogenic states.** Berry, H.G.; DeHaes, J.C.; Neek, D.; Somerville, L.P. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have made a series of measurements to investigate the final surface interaction of a thin foil on a fast ion beam. The excitation distribution and wavefunction shapes depend on the bulk of the foil and, more critically, on the final surface interaction. Previous measurements have already allowed some preliminary analysis of the observed total charge-state distributions (see for example, Argonne reports by Berry and Brooks and also by Gemmell et al.). The present objective is a more detailed microscopic understanding of the important final surface processes.

49040 (ANL—85-22, pp 218-219) **Multiply-excited states of the sodium isoelectronic sequence.** Berry, H.G.; Young, L.; Engstroem, L.; Somerville, L.P.; Kurtz, C. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have made beam-foil studies of the spectra of sodium and magnesium. Their purpose is in part to verify recent suggestions of transitions between highly-excited, doubly-excited levels in neutral sodium. Such levels may be natural reservoirs of highly-excited, but long-lived, states which can be used in soft x-ray laser systems. The authors verified all the previous sodium measurements, and made some new classifications within the doubly-excited term scheme. In addition they have measured the lifetimes of all the identified states, and are comparing them with theory. Similar transitions are also expected in the near ultra-violet

spectrum of singly-ionized magnesium. The authors have obtained preliminary spectra, and at least one of the expected transitions is observed. Work is continuing on these spectra.

49041 (ANL—85-22, pp 220) **Laser-fast ion beam interactions at the Dynamitron.** Berry, H.G.; Young, L.; Ray, W.J.; Zabransky, B.J.; Amrein, R.L. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

An initial attempt was made to observe collinear laser excitation of neutralized hydrogen and neon beams. No fluorescence was observed. The authors concluded that resonance was not observed because of the broad velocity distribution of the beam ions from the Dynamitron. They have now made measurements of the voltage ripple at the Dynamitron ion source (relative to ground potential). The measurements confirm that the ripple is large (about 400 volts at 1 MeV) and is made up of several significant frequencies. Work is proceeding on eliminating these ripple frequencies.

49042 (ANL—85-22, pp 220) **Autoionization of helium following excitation by fast, multiply charged ions.** Arcuni, P.; Berry, H.G. (Univ. of Chicago, IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Using two parallel plate electrostatic spectrometers, the authors have measured the autoionization spectra of doubly-excited helium, following excitation by charged, 700 to 3500 KeV lithium ions produced by the Dynamitron. In particular, they studied the effect of projectile nuclear charge on the helium autoionization profiles and the continuum in which they are embedded.

49043 (ANL—85-22, pp 221-223) **Fast ion beam-laser interactions.** Berry, H.G.; Young, L.; Engstroem, L.; Hardis, J.E.; Somerville, L.P.; Ray, W.J.; Kurtz, C. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors are using collinear laser excitation of fast ion beams to study a number of atomic structure problems. The problems include the determination of fine and hyperfine structure in light positive and negative ions, plus measurements of absolute wavelengths of light from two-electron ions. In addition the authors intend to use a similar experimental arrangement to study excitation and decay of high Rydberg states first in the absence of fields and then in crossed electric and magnetic fields.

49044 (ANL—85-22, pp 227-230) **Enhanced electron capture by fast heavy di-clusters exciting solids .** Cooney, P.J.; Faibis, A.; Kanter, E.P.; Koenig, W.; Maor, D.; Zabransky, B.J. (Millersville State College, PA). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have studied the dependence of the charge-state-distributions of heavy-ion fragments resulting from the foil-induced dissociation of 4.2-MeV N_2^+ ions on the thickness of the carbon target foil. The results were compared to those distributions measured for impact of 2.1-MeV N^+ projectiles. Whereas the charge-state distributions for atomic ion impact are already equilibrated in the thinnest targets used (2 $\mu g/cm^2$), those measured for molecular ion impact are strongly dependent on the target thickness, even for the thickest targets (100 $^+ g/cm^2$). The distributions for molecular-ion impact show a marked shift towards lower charge states, evidencing an enhanced electron capture probability over the case of monatomic ion impact. A quantitative model was developed to explain this phenomenon.

49045 (ANL—85-22, pp 230-232) **Post-foil interaction in foil-induced molecular dissociation.** Faibis, A.; Kanter, E.P.; Koenig, W.; Plesser, I.; Vager, Z. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have investigated the foil-induced dissociation of 175- 250- keV/amu CH^+, NH^+, and OH^+, FH^+ and NeH^+ ions by coincident detection of the fragment atoms. The dissociation energies corresponding to in-foil and post-foil interactions were deduced from the measured relative flight times of the fragment pairs to a set of detectors downstream from the target. The authors considered final states consisting of a) a proton and a heavy-ion and, b) a hydrogen atom and a heavy-ion. Surprisingly, in both cases the energy released in the post-target interaction shows a similar linear increase with the charge state of the heavy partner.

49046 (ANL—85-22, pp 232-233) **Charge-state-distributions of foil-excited heavy Rydberg atoms.** Faibis, A.; Kanter, E.P.; Koenig, W.; Zabransky, B.J. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Studies of foil-excited fast (MeV/amu) heavy ions have demonstrated large yields of high Rydberg atoms formed in such beams. Further experiments have suggested a strong target-thickness dependence of the yields of such atoms. These results have been puzzling in view of the supposed short mean free paths of such atoms in solids. In an effort to better understand these results, the authors have measured the yields of Rydberg atoms ($n \sim 100$-200) in foil-excited ^{32}S ions at an incident energy of 125 MeV.

49047 (ANL—85-22, pp 236) **Semiempirical Sternheimer shielding factors for the atomic 4f and 5d shells.** Childs, W.J.; Cheng, K.T. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In a recent Physical Review Letter, workers at Los Alamos reported new electric-quadrupole moment values for selected nuclei through study of hfs in the X-ray spectra of muonic atoms. On combining these true moment values with the apparent values previously deduced for the same nuclei from many-electron hfs studies, the authors evaluated Sternheimer shielding factors for several electron shells in various atoms. They were struck by the unreasonably large scatter in the resulting shielding factors. After some study, the authors concluded that the scatter arose from (1) questionable assumptions and procedures used earlier in analyzing the many-electron hfs, and (2) the diversity of methods used in evaluating quadrupole radial hfs integrals. Limiting themselves to the atomic 4f and 5d shells, they made a study of all atoms for which (a) a true quadrupole moment value (i.e. one determined either by muonic hfs or Coulomb excitation) was known and (b) the many-electron hfs had been studied.

49048 (ANL—85-22, pp 236-237) **Ab initio calculation of 4f/sup N/6s² hyperfine structure in neutral rare-earth atoms.** Cheng, K.T.; Childs, W.J. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Over the last few years a great deal of precise hfs data has been obtained for the low-lying levels of the 4f/sup N/6s² configurations of the neutral rare-earth atoms. The observed splittings have usually been interpreted using semi-empirical effective-operator method in which the effective radial hfs integrals were determined though least-squares fits to experimental data. In previous work, these values were compared with theoretical values, usually obtained by the configuration-average Dirac-Fock or similar methods. Although the level of agreement was normally good, a substantial number of adjustable parameters was used. In the present study a true ab initio multiconfiguration Dirac-Fock method is used to calculate the hfs splitting directly from the known values of nuclear moments. No adjustable parameters are used, and the hfs is evaluated in first order perturbation theory.

49049 **(BNL—38396) Lattice dynamics of the heavy Fermion compound UBe/sub 13/.** Tranquada, J.M.; Heald, S.M.; Pick, M.A.; Fisk, Z.; Smith, J.L. (Brookhaven National Lab., Upton, NY (USA); Los Alamos National Lab., NM (USA)). 1986. Contract AC02-76CH00016;AS05-80ER10742. 6p. (CONF-860753—5). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014774.

From International conference on EXAFS and near edge structure; Saumur, France (7 Jul 1986).

UBe_3 has unusual electronic and magnetic properties due to a narrow band of U 5f states near the Fermi energy. We have used EXAFS to compare the interatomic forces in UBe_{13} with those in $ThBe_{13}$, which has the same structure but no 5f electrons. From measurements made over the range 10 to 308 K, we have determined the temperature dependences of the mean square relative displacements (MSRD's) for the first actinide-beryllium and actinide-actinide shells in each material. The MSRD's for the corresponding shells in the two compounds were found to be quite similar. The thermal motion of the nearest-neighbor actinide-actinide pairs is shown to be due entirely to a single Einstein mode, the square of whose frequency is proportional to the actinide-Be force constant. We conclude that the presence or absence of 5f electrons on the actinide has very little effect on the actinide-beryllium bonding. 9 refs., 5 figs.

49050 **(BNL—38486) Oxygen K-edge absorption spectra of small molecules in the gas phase.** Yang, B.X.; Kirz, J.; Sham, T.K. (State Univ. of New York, Stony Brook (USA). Dept. of Physics; Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 5p. (CONF-860753—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014178.

From International conference on EXAFS and near edge structure; Saumur, France (7 Jul 1986).

The absorption spectra of O_2, CO, CO_2 and OCS have been recorded in a transmission mode in the energy region from 500 to 950 eV. Recent observation of EXAFS in these molecules is confirmed in this study. 7 refs., 3 figs.

49051 (CONF-8409129—, pp 8-12) **Multiphoton ionization of atoms in strong fields.** Crance, M. (CNRS, Orsay, France). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

Most of the features observed in strong field multiphoton ionization cannot be interpreted by perturbation theory applied at the minimum non-vanishing order. When it is realistic to assume that only one electron is involved in the process, experimental results are well reproduced by calculations in which some discrete quasi-resonant states are treated on the same footing as the initial state. These methods are not applicable to complex atoms such as noble gases. We present a simple picture of multiphoton processes which allows an interpretation of the most salient experimental features in multiphoton stripping and electron-energy spectroscopy of noble gases. 11 references, 2 figures.

49052 (CONF-8409129—, pp 13-22) **Multiphoton transitions in the ionization continuum of atoms.** Agostini, P.; Petite, G. (Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette, France). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

This paper contains two main parts: in the first one the authors summarize their contribution to the study of ATI (Above-Threshold Ionization) and discuss the role of the ponderomotive force. In the second, new results are reported on multiple ionization of calcium atoms with picosecond pulses. 26 references, 6 figures, 3 tables.

49053 (CONF-8409129—, pp 23-30) **Multiply charged ions produced in multiphoton ionization of rare gas atoms.** Lompre, L.A.; Mainfray, G. (Centre d'Etudes Nucléaires de Saclay, Gif-sur-Yvette, France). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

The present paper will be devoted to multiphoton ionization of many electron atoms in the outer shell, as rare gases. It induces removal of several electrons and the production of multiply charged ions. The production of doubly charged ions has been investigated in detail. Doubly charged ions can e produced, either by simultaneous excitation of at least two electrons, or by a stepwise process via singly charged ions. This depends mainly on the laser intensity and the photon energy. The basic interaction processes involved are considerably more complicated than for one-electron atoms. A new theoretical model will have to be developed to take into account electron correlation effects. 19 references, 5 figures.

49054 (CONF-8409129—, pp 31-41) **Studies of collision-free nonlinear processes in the ultraviolet range.** Rhodes, C.K. (Univ. of Illinois, Chicago). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

The collision-free response of atomic systems generated by intense irradiation at 193 nm exhibits several unusual properties. The behavior observed for the dependencies on atomic number, intensity of illumination, frequency, and polarization are discussed. The experimental evidence points to collective atomic motion involving several electrons and implicates a possible role for a Coster-Kronig mechanism, enabling rapid energy transfer among atomic subshells. 50 references, 2 figures.

49055 (CONF-8409129—, pp 42-47) **Multiphoton excitation of doubly excited states of two-electron atoms.** Freeman, R.R.; Bloomfield, L.A.; Cooke, W.E.; Bokor, J.; Jopson, R.M. (AT & T Bell Labs., Murray Hill, NJ). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

One of the outstanding problems in atomic physics is to better understand the dynamics of highly excited two-electron systems. On the experimental side, single photon excitation studies have been limited to relatively low-lying states in He, while electron scattering experiments do not adequately resolve individual states. This paucity of experimental data is due to three general characteristics of these highly excited double electron states: (1) they have high energies usually greater than 1 Ryd; (2) they have little overlap with the ground state; (3) single photon excitation will not efficiently excite these states. It is the purpose of this paper to discuss the multiphoton excitation of these sperial states in two-electron systems. 12 references, 4 figures.

49056 (CONF-8409129—, pp 48-57) **Multiphoton ionization via Rydberg states and effects of high laser intensity.** Leuchs, G. (Univ. of Colorado, Boulder). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

A photoionization experiment is characterized by the initial bound state of the atom, the polarization, frequency, intensity and also temporal distribution of the ionizing radiation, as well as the partial saves describing the final continuum state. The basic observable is the total ionization rate which can be differentiated with respect to the kinetic energy of the emitted photoelectrons yielding total and partial photoionization cross-sections. Additional information can be extracted if the angular distribution of either electron emission or spin polarization is measured. The angle-resolved measurement reveals interference effects which average to zero whenever the signal is integrated over all angles, quite analogously to the angular correlations observed, e.g., in γ-γ cascades or scattering of particles. At a high enough laser intensity the atom may be ionized by simultaneous absorption of several photons and photoionization is observed below the threshold for one-photon ionization. The actual light intensity required to produce such a signal strongly depends on whether or not an excitation step is in resonance with an atomic transition. The least intensity is required if photons of different frequencies are present in the light beam, each in resonance with atomic frequencies, leading to resonant stepwise ionization. Depending on the quantum numbers of the resonant interme-

diate states, the angular distribution may exhibit rather high anisotropy. By varying the polarization and frequency of the photons, one can excite different intermediate states and study their influence on the ionization signal. In this context we will also address the question of how well photoionization of Rydberg states can be described using the electric dipole approximation. 31 references 7 figures.

49057 (CONF-8409129—, pp 68-75) **Field fluctuations and multiphoton processes.** Zoller, P. (Univ. of Innsbruck, Austria). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

The origin of all laser field fluctuation effects in multiphoton processes is the nonlinearity inherent in any process where many photons are absorbed or emitted; an atom absorbing a number of photons is sensitive not only to mean intensity and bandwidth of the light but also to the kind and details of the fluctuations, i.e., the higher-order statistics of the radiation field. A theory of field fluctuation effects in multiphoton transitions consists of two element: (1) a noise model to describe the fluctuations and (2) a solution to the atomic density matrix equations with a stochastic driving field. The authors summarize some aspects of how to formulate and solve the problem of resonant multiphoton processes in stochastic fields. 18 references, 4 figures.

49058 (CONF-8409129—, pp 76-81) **Two-photon absorption from a phase diffusing laser field.** Elliott, D.S. (Purdue Univ., West Lafayette). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

In this report, the author will discuss a recent experiment in which we measured the influence of field frequency fluctuations on unsaturated two-photon absorption. The statistical properties of the frequency fluctuations in this experiment are carefully controlled, and the laser lineshape is nearly Lorentzian. This experiment provides direct confirmation of theoretical results of Mollow on the linewidth of two-photon absorption by a phase-diffusing field. This report is organized as follows. The first section presents the background of the experiment, including Mollow's results for two-photon absorption from a phase diffusing field, and a simple extension of his work to include the effect of the finite correlation time of the fluctuations. The next unit describes the manner in which the experiment was conducted, and a discussion of the results appears in the final section.

49059 (CONF-8409129—, pp 91-97) **Multiphoton effects during collisions.** Burnett, K.; Cooper, J. (Imperial College, London, England). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

We should like to present a brief progress report on multiphoton transitions occurring during collisions. The aim of the work is the development of techniques for studying collision dynamics using off-resonant excitation of atomic transitions in the presence of collisions. We shall start with the now comparatively well understood subject of collisional redistribution, dealing with single-photon absorption during collisions. The natural extension of this work to multiphoton effects is what we are pursuing. The first type of multiphoton effect we'll look at involves saturation of a two-level system: the Rabi problem of collision physics. This is an enormous topic that we shall discuss briefly and very naively. We shall turn lastly to multilevel systems where much less in known and much more remains to be done. This report will use qualitative arguments. For more rigorous discussions the reader should consult the references given in the text. 17 references, 5 figures.

49060 (CONF-8409129—, pp 99-109) **Pressure effects in the multiphoton ionization of atoms and molecules.** Johnson, P.M.; Li, L.; Porter, R.N. (State Univ., of New York, Stony Brook). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

Thirty years ago R.H. Dicke wrote "In the usual treatment of spontaneous radiation by a gas, the radiation process is calculated as though the separate molecules radiate independently of each other. This simplified picture overlooks the fact that all the molecules are interacting with a common radiation field and hence cannot be treated as independent. The model is wrong in principle and many of the results obtained from it are incorrect". Many subsequent results of magnetic resonance spectroscopy, and more recently of laser interactions have shown that Dicke stated a fundamental truth and that a collective treatment of molecules in a radiation field is often necessary. Notable examples in nonlinear optics include third harmonic generation and coherent antistokes Raman spectroscopy. We would like to present here another experimental effect which we feel is best explained by treating non-interacting molecules as a collective system. This effect is the quenching of the AC Stark shift upon an increase in the partial pressure of the molecule interacting with the radiation field. 15 references, 5 figures.

49061 (CONF-8409129—, pp 131-140) **Theoretical studies of resonantly enhanced multiphoton ionization processes in molecules.** Dixit, S.N.; Lynch, D.L.; McKoy, V. (California Institute of Technology, Pasadena). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

Multiphoton absorption and ionization processes add a new dimension to the study of excited state dynamics in atomic and molecular systems. The theoretical analysis of multiphoton ionization of diatomic molecules is nontrivial with complexities arising from the molecular aspects and from the multiphoton nature of the process. The authors have developed a general formalism for analysis of resonantly enhanced multiphoton ionization (REMPI) processes in diatoms. In this paper the vibrational branching ratios resulting from a (3 + 1) REMPI of H_2 via the $C^1Pi/sub\ u/$ state are analyzed.

49062 (CONF-8409129—, pp 151-163) **Resonant two-photon ionization and dissociation of the hydrogen atom and molecule.** Welge, K.H.; Rottke, H. (Universitaet Bielefeld, Germany, F.R.). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

In this paper we report on two experimental studies: (a) the ionization of the H atom in strong external electric fields around the ionization limit by state-selective two-photon, one-photon resonant excitation through single sublevels of the n = 2 Stark manifold as intermediate step, and (b) the two-photon, one-photon resonant ionization and dissociation of the H_2 molecule through selected rotational-vibrational levels of the $B^1\Sigma^+/sub\ u/$ electronic state as intermediate step. 27 references, 9 figures.

49063 (CONF-8409129—, pp 164-173) **Multiphoton ionization photoelectron spectroscopy for excited-state atoms and molecules.** Kimura, K. (Institute for Molecular Science, Okazaki, Japan). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

Multiphoton ionization (MPI) is remarkably enhanced, when atoms and molecules are pumped to resonant excited states by visible and UV lasers. On the other hand, a photoelectron spectroscopic technique using resonant MPI has been developed to study photoelectron spectra of electronically excited states in this laboratory and other in the early 1980's. Such laser photoelectron spectroscopy makes it possible to obtain excited-state photoelectron spectra which are very useful for studying dynamic behavior of excited states and ionic states from a new spectroscopic point of view. 28 references, 3 figures.

49064 (CONF-8409129—, pp 174-181) **2-step photoionization of benzene: mechanism and spectroscopy.** Mueller, G.; Lompa, K.L.; Schmid, W.E.; Lyman, J.L.; Trushin, S. (Max-Planck-Institut fuer Quantenoptik, Garching, Germany, F.R.). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

Some results are summarized on the UV-laser-induced resonant 2-photon-ionization of the benzene molecule. The discussion starts with the general excitation and fragmentation behavior including some work with psec laser pulses and goes on to spectroscopic information obtained by measurements of fluorescence form the intermediate (1 photon-resonant) states and comparative measurements of ion currents. 14 references, 9 figures.

49065 (CONF-8409129—, pp 182-190) **Multiphoton ionization spectroscopy of surface molecules.** Antonov, V.S.; Letokhov, V.S. (Institute of Spectroscopy, Moscow, USSR). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

In this paper, we will consider (a) the production of free ions upon irradiation of a surface by nanosecond laser pulses / regime (1)/ in a weak electric field, special attention being paid to the use of the IR-UV laser desorption/MPI technique for the detection of surface molecules, and (b) the MPI-stimulated desorption of ions in a strong electric field. 15 references, 6 figures.

49066 (CONF-8409129—, pp 191-199) **Experimental investigation of the possibilities of the optical tunnelling of electron from a metal surface induced by strong CO_2 laser pulses.** Farkas, G.; Chin, S.L. (Central Research Institute of Physics, Budapest, Hungary). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

According to the fundamental laws of the intense field QED, the general processes governing the laser-induced electron emission from atoms or solids traditionally may be interpreted as two complementary limiting interaction processes of the same phenomenon. The first is the multiphoton type process, when the electron interacts only with several well determined small number of photons (quantum limit), the second is the tunnelling type, when the number of the interacting photons is increasingly high (classical limit). While practically all research activity was concentrated both theoretically and experimentally to the multiphoton questions, less attention was paid to the tunnelling case, in spite of the fact that the early beginning of the intense field QED started with the pronunciation of this latter. After a short summarizing formulation of the topics, we describe several experiments performed by use at the Laval University for the study of the laser induced tunnelling. The surface photoeffect of gold proved to be a good experimental tool for these studies giving complementary results to the experiments carried out by use for the tunnel ionization of gas atoms. 36 references, 9 figures.

49067 (CONF-8606157—2) **Mayer-Fermi theory and the long sequences in the periodic table.** Griffin, D.C.; Cowan, R.D.; Pindzola, M.S. (Rollins Coll., Winter Park, FL (USA). Dept. of Physics; Oak Ridge National Lab., TN (USA). Physics Div.; Los Alamos National Lab., NM (USA); Auburn Univ., AL (USA). Dept. of Physics). 1986. Contract W-7405-ENG-36;AC05-84OR21400;FG05-86ER53217. 23p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014232.

From NATO advanced study conference; Les Houche, France (16 Jun 1986).

Changes in the radial wave functions for d electrons which occur preceding the onset of the transition series of elements and for f electrons preceding the onset of the lanthanide and actinide series are examined. The sensitivity of the radial wave functions to variations in the effective potential is discussed, and the large variation in the radial wave functions between the LS terms of certain types of excited configurations in these regions of the periodic system is analyzed. Several examples of electron-impact ionization are explained by analyzing the effective potentials for the excited electrons in the intermediate autoionizing states. 46 refs., 18 figs. (WRF)

49068 (CONF-8606166—1) **Detection of single atoms by resonance ionization spectroscopy.** Hurst, G.S. (Tennessee Univ., Knoxville (USA). Dept. of Physics). 1986. Contract AC05-84OR21400. 36p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86011974.

From Meeting of the Fellows of the Royal Society; London, UK (27 Jun 1986).

Rutherford's idea for counting individual atoms can, in principle, be implemented for nearly any type of atom, whether stable or radioactive, by using methods of resonance ionization. With the RIS technique, a laser is tuned to a wavelength which will promote a valence electron in a Z-selected atom to an excited level. Additional resonance or nonresonance photoabsorption steps are used to achieve nearly 100% ionization efficiencies. Hence, the RIS process can be saturated for the Z-selected atoms; and since detectors are available for counting either single electrons or positive ions, one-atom detection is possible. Some examples are given of one-atom detection, including that of the noble gases, in order to show complementarity with AMS methods. For instance, the detection of ^{81}Kr using RIS has interesting applications for solar neutrino research, ice-cap dating, and groundwater dating. 39 refs., 7 figs., 2 tabs.

49069 (DOE/ER/53188—T1) **Experimental investigations of electron capture from atomic hydrogen and deuterium by alpha particles. Annual report, 1 October 1984-30 September 1985.** Gay, T.J. (Missouri Univ., Rolla (USA). Dept. of Physics). 1 Jan 1985. Contract FG02-84ER53188. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014243.

The major effort of this past year has been spent in designing and building the resistor assemblies and controls necessary to modify the UMR ion energy-loss spectrometer for studies of the type described in our original proposal. Specifically, we are interested in the collision $He^{++} + H \rightarrow He^{+}(n) + H^{+}$ and measurement of the total capture cross section as a function of n for He^{++} energies between 25 and 200 keV.

49070 (INIS-mf—10411) **Inner shell ionization by fast protons, alpha particles and carbon ions.** Dijk, J.H. van. (Rijksuniversiteit Groningen (Netherlands)). 12 Oct 1984. 123p. NTIS (US Sales Only), PC A06/MF A01. File Number DE86703113.

The subject of this thesis is the study of inner-shell excitations of atoms induced by fast charged particle collisions. A new method is described for measuring the spectrum of delta-electrons emitted by ^{208}Pb after excitation by 15 MeV protons or 50 MeV alpha particles. Experimental equipment is described. Results of both experiments are presented and compared with PWBA models and with calculations based on a semi-classical approximation. The small-impact-parameter ionization probabilities obtained are then compared with literature. Also small-impact-parameter measurements done with 100 MeV carbon ions are described. Besides K-shell measurements, the author also presents L-subshell ionization probability results for Pb. An appendix is added in which energy straggling problems in solid targets are treated. Includes Dutch summary; 117 refs.; 46 figs.; 19 tabs.

49071 (IPPJ—728) **Some physical differences between sheet plasma and multicusp plasma as volume produced H^- or D^- ion sources.** Uramoto, Joshin. (Nagoya Univ. (Japan). Inst. of Plasma Physics). Mar 1985. 20p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703119.

In the H^- ion volume production by means of a sheet plasma the extracted H^- ion current increases towards the outside across the magnetic field. This fact means that H^- ions are produced outside of the sheet plasma, and is in contrast with the fact that H^- ions in the multicusp plasma are produced almost in the center region without magnetic field. Furthermore, in the optimum condition for extracting H^- ions from the sheet plasma, the potential of the first extraction electrode is biased more negatively than that of the discharge anode or the plasma potential, while, in the optimum condition for the multicusp plasma, it is biased more positively. These physical differences between the two plasmas are related

with confinement regions of electrons and ambipolar diffusions of plasma without magnetic field or across magnetic field.

49072 (IPPJ—730) Measuring method and confirmation of H^-, D^- ion current by sheet plasma, 1. Uramoto, Joshin. (Nagoya Univ. (Japan). Inst. of Plasma Physics). May 1985. 15p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703121.

Usually, it is very difficult to separate an electron current from H^- or D^- ion current under volume production, because both electrons and H^- or D^- ions are extracted from a discharge plasma in H_2 or D_2 gas. However, H^- or D^- ion current by volume production in the sheet plasma can be easily separated from electron current by using the weak magnetic field applied to the sheet plasma itself. Then, if the H^- or D^- ion current is compared with positive ion (mainly H_3^+ or D_3^+) current which is extracted by changing sign of the acceleration voltage from plus (for H^- or D^- ion) to minus, the H^- or D^- ion current can be confirmed more exactly.

49073 (IPPJ—731) Size effects of vacuum chamber for H^-, D^- ion volume production by sheet plasma, 1. Uramoto, Joshin. (Nagoya Univ. (Japan). Inst. of Plasma Physics). May 1985. 17p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703122.

In order to produce H^- (D^-) ions effectively by volume production in the sheet plasma, effects of vacuum chamber are studied by using two sizes of metal vacuum chamber and by changing their bias voltages for the plasma potential of the sheet plasma. Then, we find the H^- (D^-) ion current increases abruptly with distance between the sheet plasma surface and the chamber wall perpendicular to the magnetic field, while it takes a maximum near a floating potential of the chamber (negative for the plasma potential outside of the sheet plasma). These effects are related with a size of space where the plasma potential is higher than those of boundaries parallel and perpendicular to the magnetic field. That is, the H^- (D^-) ion current increases with the spatial size in which H^- (D^-) ions are confined and hydrogen (deuteron) positive ions are lost rapidly along the magnetic field.

49074 (KU-HCOE-FL2-R—85-27) Low-energy heavy-atom impact as a tool for production and classification of doubly excited states. Andersen, N. (Copenhagen Univ. (Denmark). H.C. Oersted Inst.; Aarhus Univ. (Denmark). Inst. of Physics). 1985. 9p. (CONF-860148—6). NTIS (US Sales Only), PC A02/MF A01. File Number DE86752094.

From 2. United States/Mexico cooperative symposium on atomic and molecular physics; Cocoyoc, Mexico (1 Jan 1986).

Low-energy heavy-atom impact may be an efficient way of preferentially populating doubly excited levels. Using neon as an example, this paper discusses why this is so. The similarity of the structure of the energy level diagrams for doubly excited neon and the level scheme for neutral magnesium is pointed out, suggesting that collective quantum numbers may describe the electron pair.

49075 (LA-UR—86-2369) Experimental studies of photon-surface interaction dynamics in the alkali halides. Haglund, R.F. Jr.; Tolk, N.H. (Vanderbilt Univ., Nashville, TN (USA). Dept. of Physics and Astronomy). 1986. Contract W-7405-ENG-36. 11p. (CONF-860880—17). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013852.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

We describe recent measurements which have provided, in unprecedented detail, insights into the electronic mechanisms through which energy carried into a material by photon irradiation is absorbed, localized and rechanneled to produce desorption, surface modification, erosion and damage. The specific object of these studies has been desorption induced by electronic transition in alkali halide crystals, with particular emphasis on the dynamics of changes in the surface and near-surface regions. In our experiments, the irradiating ultraviolet photons are provided by a synchrotron storage ring, and the dynamical information about desorption products is obtained from optical measurements of the quantum states, yields and velocity distributions of neutral ground-state and excited-state atoms ejected from the surface of the irradiating material. These studies have shown that the dominant exit channels in photon-induced particle emission are those producing ground-state and excited-state neutral atoms. Using dynamical information about these desorbing neutral species, obtained, for example, by laser-induced fluorescence and laser Doppler spectroscopy, we are generating an increasingly comprehensive picture of the dynamics of electronic energy flow into and out of pure crystalline surfaces in these prototypical dielectrics. We are also beginning to be able to relate desorption dynamics to specific materials properties, and to discriminate between pure surface and near-surface effects in these materials. Applications of these techniques to the problem of photon-induced surface damage and to analysis of surface dynamics in dielectric materials are discussed, and the relationships between these nearly ideal model materials and the non-crystalline, covalently bonded materials more typical of real optical elements are pointed out. 19 refs., 13 figs.

49076 (LRAP—47) Report to the evaluation committee on Swedish atomic and molecular physics. Svanberg, S.; Lundberg, H. (Lund Univ. (Sweden). Dept. of Physics). 1985. 42p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703228.

The scientific evaluation is planned to be performed by an international group of prominent physicists. Groups being evaluated have been requested to present background material on their research. The atomic physics program discussed in this report form the basis for a large applied laser spectroscopy program. Projects on atmospheric remote sensing, combustion diagnostics, industrial laser applications and medical diagnostic spectroscopy have emerged from this program. Accomplishments and publications 1980-1985 are presented and the planned research 1985-1988 is described. Project financing and cooperation with other groups is discussed. The list of references contains 80 papers.

49077 (ORNL—6293) Two-photon induced fluorescence and other optical effects in irradiated and doped fused silica. Kramer, S.D. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 57p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014422.

The objective of this program was to assess and identify irradiation techniques which could be used to modify the optical characteristics of doped fused silica. Primary emphasis was placed on determining if gamma ray or neutron bombardment of the glass would enhance certain Raman and nonlinear optical effects. In particular, the effect of irradiation on optical two photon induced fluorescence was studied in detail. The maximum radiation exposures used were 10^6 rads (Si) of gamma rays and neutron fluences of 1×10^{14} neutrons/cm^2. The optical measurements were made at room temperature between one and four months after irradiation. The maximum input light intensity was 10^9 watts/cm^2 at a near infrared (1.06 μ) input wavelength which was chosen to lie in a transparent spectral region of the glass. Under these experimental conditions a careful search revealed no detectable two-photon induced fluorescence in the region from 550 to 900 nm. The upper limit for the photon efficiency of this process was determined to be less than 1×10^{-10}%. 89 refs., 12 figs.

49078 (OUP—86-05) Symmetries and rotational line intensities in diatomic molecules. Veseth, L. (Oslo Univ. (Norway). Fysisk Inst.). Feb 1986. 38p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703229.

The general theory of angular momenta and the full rotation group is used to reconsider the theory of the intensity factors of rotational lines in the spectra of diatomic molecules (Hoenl-London factors). It is shown that the use of the rotational symmetry (rotation matrices) leads to compact derivations of the symmetry properties of the molecular wave functions, as well as the matrix elements of the transitions operator. The present work is restricted to spin-allowed electric dipole transitions, and the general sum rule characteristic of this type of transitions is rederived by use of the general angular momentum theory. A main purpose of the present work has been to provide a unified theoretical basis for exact numerical computations of Hoenl-London factors for all types of spin-allowed electric dipole transitions in diatomic molecules. The computed Hoenl-London factors are then in the next step intended to

be the basis for construction of synthetic molecular band spectra, with particular applications to upper atmosperic emissions.

49079 (RAL—84-116) More seminars on muonium spectroscopy. Cox, S.F.J. (Rutherford Appleton Lab., Chilton (UK)). Dec 1984. 75p. NTIS (US Sales Only), PC A04/MF A01. File Number DE86703112.

The paper concerns topics which illustrate the use of muonium spectroscopy in four major areas. The experimental method - muon spin rotation (muSR) is employed in the four topics, which include: muSR studies in magnetism, muons in metals and metal hydrides, muonium in semiconductors and muSR studies in chemistry.

49080 (SAND—86-1751C) Quantum mechanical and classical mechanical calculations of the dynamics of molecular collisions. Schwenke, D.W.; Truhlar, D.G.; Coltrin, M.E. (Minnesota Univ., Minneapolis (USA). Dept. of Chemistry; Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 9p. (CONF-8606173—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013573.

From 1. symposium on computational chemistry on cray supercomputers; Minneapolis, MN, USA (11 Jun 1986).

Whenever energy is deposited non-thermally in a system, further evolution of that system is governed by a competition between hot processes and energy relaxation to a Boltzmann distribution. Thus the study of energy transfer in molecular collisions is central to many areas of application including laser-beam energy deposition, laser-beam production, and mode-selective chemistry. Molecular energy relaxation is often dominated by slightly off-resonant vibrational-to-vibrational (V-V) energy transfer. Thus we have embarked on a research project whose long-term goal is the accurate quantum mechanical prediction of V-V energy transfer probabilities in molecular collisions. Such calculations are very difficult and will require at least a class-VI computer for their execution. We have selected HF-HF collisions for detailed study because they have been very widely studied experimentally. A recent compilation of chemical laser systems contains 240 systems of which 190 involve hydrogen halides, and most of these involve HF. The major loss process limiting the efficiency of HF chemical lasers under most conditions are collisional self-deactivation.

49081 Collision strengths and line strengths for all transitions among the levels of the 1s-italic^{2}2s-italic^{2}2p-italic,1s-italic^{2}2s-italic2p-italic^2, and 1s-italic^{2}2p-italic^3 configurations of boron-like ions. Sampson, D.H.; Weaver, G.M.; Goett, S.J.; Zhang, H.; Clark, R.E.H. (Department of Astronomy, Pennsylvania State University University Park, Pennsylvania 16802 Los Alamos National Laboratory, Groups T-4 and X-7 Los Alamos, New Mexico 87545). *Atomic Data and Nuclear Data Tables;* **35**: No. 2, 223-266(Sep 1986). Contract FG02-85ER53208.

Collision strengths and electric-dipole line strengths have been calculated for all fine-structure transitions among the levels of the 1s-italic^{2}2s-italic^{2}2p-italic, 1s-italic^{2}2s-italic2p-italic^2, and 1s-italic^{2}2p-italic^3 configurations in 17 boron-like ions with nuclear charge number Z-italic in the range 10< or =Z-italic< or =74. From these results the collision strengths and line strengths for transitions between energy terms and their analogs in j-italicj-italic coupling can also be obtained. The collision strength data cover impact-electron energies < or =3.25Z-italic^2 Ry or 44.2Z-italic^2 eV. The effects of configuration mixing, parentage mixing, and intermediate coupling have been included in the calculations. The method used in calculating the collision strengths is a Coulomb-Born-Exchange method well suited for treating many members of an isoelectronic sequence simultaneously. The complete results have been given in terms of fits to simple functions of the impact-electron energy that are readily integrated over a Maxwellian distribution to obtain collision rates. Some discussion is given of important differences between the present method and the more usual Coulomb-Born-Exchange method, where it is assumed that the free electron sees the screened nuclear charge (Z-italic—N-italic).

49082 Collision strengths and line strengths for all transitions among the levels of the 1s-italic2l-italic2l-italic' configurations of Li-like ions. Zhang, H.; Sampson, D.H.; Clark, R.E.H. (Department of Astronomy, Pennsylvania State University University Park, Pennsylvania 16802). *Atomic Data and Nuclear Data Tables;* **35**: No. 2, 267-318(Sep 1986).

Collision strengths and electric-dipole line strengths have been calculated for all fine-structure transitions among the levels of the ls-italic2l-italic2l-italic' configurations in 19 Li-like ions with nuclear charge number Z-italic in the range 6< or =Z-italic< or =74. From these results the collision strengths and line strengths for transitions between energy terms and their analogs in j-italicj-italic coupling can also be obtained. The collision strength data cover impact-electron energies < or =3.25Z-italic^2 Ry or 44.2Z-italic^2 eV. The effects of configuration mixing, parentage mixing, and intermediate coupling have been included in the calculations. The method used in calculating the collision strengths is a Coulomb-Born-Exchange method well suited for treating many members of an isoelectronic sequence simultaneously. The complete results have been given in terms of fits to simple functions of the impact-electron energy that are readily integrated over a Maxwellian distribution to obtain collision rates.

49083 Experimental apparatus for photon/ion coincidence measurements of dielectronic recombination. Gardner, L.D.; Kohl, J.L.; Lafyatis, G.P.; Young, A.R.; Chutjian, A. (Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts 02138). **57**: No. 9, 2254-2265(Sep 1986).

An inclined beams apparatus for the measurement of absolute cross sections for dielectronic recombination between free electrons and singly or multiply charged ions is described. The collision products, a photon and a lower-charge-state ion, are detected in delayed coincidence. Measurements of dielectronic recombination in C^{3+} are described to illustrate the use of the apparatus and techniques. Verification of the calibrations and operation of the apparatus is demonstrated through measurements of charge transfer and electron impact excitation.

49084 Orbital forces and chemical bonding in density-functional theory: Application to first-row dimers. Averill, F.W.; Painter, G.S. (Metals and Ceramics Division, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37831). **34**: No. 4, 2088-2096(15 Aug 1986). Contract AC05-84OR21400.

The local-density-functional description of chemical bonding in first-row homonuclear dimers is analyzed in terms of both static and dynamic orbital forces. The dynamic orbital force of the i-italicth molecular orbital is equal to the negative of the derivative of the one-electron energy epsilon-c/sub i-italic/ with respect to the p-italicth nuclear coordinate, i.e., -partialepsilon-c/sub i-italic//partialX/sub p/. The static orbital force is also equal to a derivative of the one-electron energy, but the differentiation is carried out with the orbital held fixed, i.e., (-partialepsilon-c/sub i-italic//partialX/sub p/)psi. It is shown that the static force is the orbital's contribution to the total Hellmann-Feynman force, whereas the dynamic force describes the change in the total force due to change in the orbital's occupation number. The chemical bond force in the first-row dimers is observed to be a delicate balance between bonding and antibonding orbital forces. Most of the bond force comes from the 2σ/sub g-italic/ orbital and to a lesser extent from the 1π/sub u-italic/ state. The polarization of the core orbitals in N_2, O_2, and F_2 is found to originate indirectly through their interaction with the 3σ/sub g-italic/ orbital. The dynamic orbital force gives accurate predictions about the change of equilibrium bond distances accompanying electronic ionization and excitation. The formalism and results are related to earlier Hartree-Fock studies.

49085 Lifetimes for spontaneous emission from the X-italic $^3u^-$ (v-italic = 1) and a-italic $^1\Delta$ states of CH^-. Okumura, M.; Yeh, L.I.; Normand, D.; Lee, Y.T. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory; Department of Chemistry, University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **85**: No. 4, 1971-1976(15 Aug 1986). Contract AC03-76SF00098.

The radiative decay of excited CH^- trapped in a radio frequency ion trap was measured, and the total excited state population was probed by observing the depletion of trapped CH^- caused by photodetachment at 1.16 eV, below the expected electron affinity for the ground $^3\Sigma^-$ state. The signal decayed biexponentially with time. We assigned the long lived state (lifetime 5.9+0.8, -0.6 s) as the metastable a-italic $^1\Delta$ state previously identified in the photoelectron spectrum. The fast decay, with a lifetime of 1.75 +- 0.15 ms, was attributed to the first excited vibrational level of the ground $^3\Sigma^-$ state, in good agreement with a theoretical result by Manz, Zilch, Rosmus, and Werner. These results support the electron affinity of 1.238 eV for CH^- obtained by Kasdan, Herbst, and Lineberger from photoelectron spectroscopy, and contradict the value of 0.74 eV determined by Feldmann from photodetachment spectroscopy.

49086 **Infrared spectra of the cluster ions $H_7O^+{}_3xH_2$ and $H_9O^+{}_4xH_2$.** Okumura, M.; Yeh, L.I.; Myers, J.D.; Lee, Y.T. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory; Department of Chemistry, University of California, Berkeley California 94720). *Journal of Chemical Physics;* **85**: No. 4, 2328-2329(15 Aug 1986). Contract AC03-76SF00098.

Infrared spectra of hydrated hydronium ions weakly bound to an H_2 molecule, specifically $H_7O^+{}_3xH_2$ and $H_9O^+{}_4xH_2$, have been observed. Mass-selected parent ions, trapped in a radio frequency ion trap, are excited by a tunable infrared laser; following absorption, the complex predissociates with loss of the H_2, and the resulting fragment ions are detected. Spectra have been taken from 3000 to 4000 cm^{-1}, with a resolution of 1.2 cm^{-1}. They are compared to recent theoretical and experimental spectra of the hydronium ion hydrates alone. Binding an H_2 molecule to these clusters should only weakly perturb their vibrations; if so, our spectra should be similar to spectra of the hydrated hydronium ions $H_7O^+{}_3$ and $H_9O^+{}_4$.

49087 **Alkaline earhtlike spectra in highly ionized members of the Sm isoelectronic sequence.** Curtis, L.J. (Department of Physics and Astronomy, Universtiy of Toledo, Toledo, Ohio 43606). *Journal of the Optical Society of America B: Optical Physics;* **3**: No. 8, 1102-1106(Aug 1986).

Energies and radiative transition probabilities have been computed for the 5s-italic^2 ^{1}S-italic/sub o-italic/—5s-italic5p-italic ^{1}/sup ,/^{3}P-italic/sub J-italic/ intervals in highly ionized members of the 62 electron samarium isoelecctronic sequence by using a-italicb-italic i-italicn-italici-italict-italici-italico-italic multiconfiguration Dirac-Fock methods. For Z-italic>74 these become the lowest-lying levels, and the ion assumes an alkalkine earthlike structure. Excitation energies and E1, M1, E2, and M2 transition probabilities for the 5s-italic5p-italic levels are reported for the ions Re^{+13} through U^{+30}. Isoelectronic trends in the relative spacings of the 5s-italic5p-italic levels were also investigated by using semiempirical screening parameterizations of the intermediate coupling equations for the spin—orbit and exchange energies. These trends are compared with systematic regularities noted earlier in the homologous Be, Mg, Zn, and Cd sequences, and possibilities for precise extrapolative predictions are examined.

49088 **Transitions of the type 2s-italic-2p-italic in oxygen-like Y, Zr, and Nb.** Behring, W.E.; Brown, C.M.; Feldman, U.; Seely, J.F.; Reader, J.; Richardson, M.C. (Laboratory for Solar Physics and Astrophysics, Goddard Space Flight Center, Greenbelt, Maryland 20771). *Journal of the Optical Society of America B: Optical Physics;* **3**: No. 8, 1113-1115(Aug 1986).

Transitions of the type 2s-italic—2p-italic in the oxygenlike ions Y XXXII, Zr XXXIII, and Nb XXXIV were identified in spectra recorded at the University of Rochester's Omega laser facility. Solid targets were spherically irradiated by 24 beams of frequency-tripled (351-nm) Nd:glass laser radiation. The spectra were photographed with a 3-m grazing incidence spectrograph. The identified transitions of the oxygen-like ions are in the range 30 to 73 A-circle. The wavelengths for the magnetic-dipole transitions within the 2s-italic^{2}2p-italic ground configurations of these ions are predicted from the experimental energy levels.

49089 **Corrections to van der Waals forces.** Manson, J.R.; Ritchie, R.H. (Department of Physics and Astronomy, Clemson University, Clemson, South Carolina 29634). **57**: No. 2, 261-261(14 Jul 1986).

A Comment on the Letter by C. K. Au and Richard J. Drachman, Phys. Rev. Lett, 56, 324 (1986).

49090 **Evidence for correlated double-electron capture in low-energy collisions of O/sup 6+/ with He.** Stolterfoht, N.; Havener, C.C.; Phaneuf, R.A.; Swenson, J.K.; Shafroth, S.M.; Meyer, F.W. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **57**: No. 1, 74-77(7 Jul 1986). Contract AC05-84OR21400.

Production of L-italicM-italicM-italic-Auger and L-italic$_1$L/sub 23/M-Coster-Kronig electrons in 60-keV O/sup 6+/+He and 40-keV C/sup 4+/+He collisions were measured with high resolution by the method of 0° Auger spectroscopy. Oxygen impact is found to create intense Coster-Kronig lines attributed to the configurations 1s-italic^{2}2pnl with n-italic> or =6 which are produced by double-electron capture. Strong evidence is provided that the double-capture process involves electron-correlation effects whose analysis leads beyond the independent-electron model.

49091 **Optical pumping of rare-gas metastable atom beams with a frequency modulated multimode dye laser.** Lynn, J.G.; Hart, H.W.; Jeys, T.H.; Dunning, F.B. (Rice University, Houston, Texas 77251). *Applied Optics;* **25**: No. 13, 2154-2157(1 Jul 1986).

Very efficient stable optical pumping of an argon metastable atom beam is achieved using a frequency-modulated multimode dye laser. Frequency modulation is accomplished by rapidly oscillating the laser output coupler using a piezoelectric translator. This technique appears attractive for use in optically pumping a wide variety of atomic species.

49092 **Electron-impact ionization of multicharged metal ions: Ni/sup 3+/, Cu/sup 2+/, Cu/sup 3+/, and Sb/sup 3+/.** Gregory, D.C.; Howald, A.M. (Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **34**: No. 1, 97-102(Jul 1986). Contract AC05-84OR21400.

Absolute electron-impact ionization cross sections were measured as a function of collision energy for the multicharged metallic ions Ni/sup 3+/, Cu/sup 2+/, Cu/sup 3+/, and Sb/sup 3+/. The measurements cover an energy range from below threshold to 1000 eV (1500 eV for Cu/sup 2+/). Recent distorted-wave direct ionization calculations agree with the measurements for Ni/sup 3+/, Cu/sup 2+/, and Cu/sup 3+/ within 20%. Inner-shell excitation followed by autoionization produces up to a factor-of-2 enhancement in the Sb/sup 3+/ cross section, and a rapid decrease in this indirect contribution at higher energies indicates the dominance of dipole-forbidden excitations.

49093 **Molecular physics and chemistry applications of quantum Monte Carlo.** Reynolds, P.J.; Barnett, R.N.; Hammond, B.L.; Lester W.A. Jr. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). **43**: No. 3, 1017-1026(Jun 1986). Contract AC03-76SF00098.

We discuss recent work with the diffusion quantum Monte Carlo (QMC) method in its application to molecular systems. The formal correspondence of the imaginary-time Schroedinger equation to a diffusion equation allows one to calculate quantum mechanical expectation values as Monte Carlo averages over an ensemble of random walks. We report work on atomic and molecular total energies, as well as properties including electron affinities, binding energies, reaction barriers, and moments of the electronic charge distribution. A brief discussion is given on how standard QMC must be modified for calculating properties. Calculated energies and properties are presented for a number of molecular systems, including He, F, F^-, H_2, N, and N_2. Recent progress in extending the basic QMC approach to the calculation of "analytic" (as opposed to finite-difference) derivatives of the energy is presented, together with an H_2 potential-energy curve obtained using analytic derivatives.

49094 **Monte Carlo calculations of atoms and molecules.** Schmidt, K.E.; Moskowitz, J.W. (Courant Institute of Mathematical Sciences, 251 Mercer St., New York, N.Y. 10012). **43**: No. 3, 1027-1042(Jun 1986).

The variational and Green's function Monte Carlo (GFMC) methods can treat many interesting atomic and molecular problems. These methods can give chemical accuracy for up to 10 or so electrons. The various implementations of the GFMC method, including the domain Green's function method and the short-time approximation, are discussed. Results are presented for several representative atoms and molecules.

49095 **Theoretical lifetimes, transition energies, fluorescence yields, and nonradiative branching ratios for highly excited states of lithium-like argon.** Bhalla, C.P.; Tunnell, T.W. (Kansas State Univ., Manhattan). **32**: No. 2, 141-158(1984). Contract AC02-76ER02753.

Theoretical transition rates and transition energies for the states of the excited electron configurations, 1s 2s nl and 1s 2p nl, of lithium-like argon were calculated. The values of n considered range from n = 2 to n = 4 with all allowed values of l included, l = 0 to l = n-1. Numerical results for the theoretical lifetimes, transition energies, fluorescence yields, and nonradiative branching ratios are given. These quantities are related to the dielectronic recombination rates and cross sections of helium-like argon.

49096 **Diagnostics for the NBETF actively cooled beam dump.** Theil, E.; Jacobson, V. (Lawrence Berkeley Lab., CA, USA). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

Lawrence Berkeley Laboratory's Neutral Beam Engineering Test Facility is currently testing multi-megawatt beams with pulse durations of up to 30 seconds. For this purpose, an actively cooled beam dump composed of heat-absorbing panels that dissipate the beam energy via high speed water flow has been installed and tested. The panels are mounted in a complex assembly necessary to accommodate the variety of ion sources to be tested. The beam dump required new diagnostics of two kinds: beam diagnostics that provide graphic and quantitative information about the beam, as inferred from energy transferred to the water, and panel diagnostics that provide graphic and quantitative information about the beam dump itself.

49097 **Electron-impact collision strengths for excitation of He-like ions from the levels with n = 1 and 2 to all singly excited levels with higher n ≦ 5.** Sampson, D.H.; Goett, S.J.; Clark, R.E.H. (Pennsylvania State Univ., University Park). *Atomic Data and Nuclear Data Tables;* **29**: No. 3, 467-534(Nov 1983). Contract AC02-76ET53056.

Intermediate-coupling collision strengths were calculated for all transitions of the kind 1s2p/sup 2S + 1/P/sub J/ - 1sn'l'/sup 2S' + 1/L'/sub J'/ with n' = 3,4 and 5 and l' ≧ 1 (p, d, f, g) for 20 He-like ions with nuclear charge number Z in the range 4 ≦ Z ≦ 74. The method used is a Coulomb-Born-Exchange method especially well suited for calculating results from any members of an isoelectronic sequence simultaneously. The calculations were made for nine impact-electron energies in threshold units epsilon = 1.0, 1.2, 1.5, 1.9, 2.5, 4.0, 6.0, 10.0, and 15.0. The results are given in the form of fits to a simple function of epsilon that is readily integrated over a Maxwellian to obtain collision rates. The parameters required in obtaining collision strengths for the simpler transitions from the 1s2p levels to the 1sn's levels the 3 ≦ n' ≦ 5 and for the transitions from the ground level and the 1s2s levels to all singly excited levels with higher n values ≦ 5 are given, as well. Results for transitions between energy terms and their jj coupling analogs are also included. In addition, calculated values for the transition energies and the electric-dipole radiative line strengths are given for all transitions. 21 references, 11 tables.

6404 Fluid Physics

REFER ALSO TO CITATION(S) 48028

49098 **(AD-A—168008/1/XAB) GAMBLE-II imploding sodium plasma. 2. Uniformly filled z-pinch. Memorandum report, October 1985-February 1986.** Davis, J.; Rogerson, J.E.; Apruzese, J.P. (Naval Research Lab., Washington, DC (USA)). 8 May 1986. 35p. (NRL-MR—5776). NTIS, PC A03/MF A01.

The dynamics and radiative properties of a GAMBLE II imploded uniformly filled sodium z-pinch plasma are described. Parameters for the initial plasma have been carefully chosen to coincide with current experiments involving a capillary discharge. Results indicate that the sodium helium-like resonance line achieves sufficiently high radiated flux levels to provide an interesting source of radiation for fluorescence and x-ray laser experiments with a comparison neon plasma.

49099 **(DOE/ER/60415—2) Vacuum ultraviolet electronic properties of liquids. Eighteen year progress report, November 1, 1968-January 31, 1987.** Painter, L.R. (Tennessee Univ., Knoxville (USA). Dept. of Physics and Astronomy). Jul 1986. Contract FG05-86ER60415. 33p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014677.

The principal aim of this program has been to study the eletronic structure of liquids over a broad energy range, 2 to 25 eV. These studies basically consist of measuring the reflectance, transmittance, photoionization and photoemission of liquids in the vacuum ultraviolet spectral region as a function of angle of incidence and photon energy. Such measurements are analyzed to yield the optical and dielectric functions of the liquid as functions of photon energy. These functions describe electron motion in liquids as stimulated by nuclear radiation, visible and ultraviolet light, and charged particles. A knowledge of the interactions of radiation with molecular liquids has direct biological application in terms of understanding radiation damage to living material, to radiotherapy, to radiation dosimetry, to problems in cell biology, and to calculation of the actual degree of adhesive interactions between biological cells and between cells and artificial matter. Applications are made to radiation chemistry, upper atmospheric physics, and aerosol formation. 31 refs.

49100 **(SAND—85-2707C) Numerical solutions to creeping flow equations. Part 1. Falling ball rheometry.** Wagner, N.; Mondy, L.A.; Miller, J.D.; Graham, A.L.; Cook, W.A. (Princeton Univ., NJ (USA). Dept. of Chemical Engineering; Sandia National Labs., Albuquerque, NM (USA); Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36;AC04-76DP00789. 16p. (CONF-860760—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014142.

From 17. annual meeting of the Fine Particle Society; San Francisco, CA, USA (28 Jul 1986).

Numerical solutions are described for the velocity and stress fields in a viscous Newtonian liquid contained in a cylindrical vessel during the passage of a solid sphere settling under the influence of gravity. By taking advantage of the mathematical analogy between incompressible creeping flow of a Newtonian liquid and incompressible elasticity in a Hookean solid, we use advanced, finite element, computer programs developed for solid mechanics to perform creeping flow calculations. The drag on the sphere, in an unbounded fluid, would be given by Stokes' law. Using finite element stress codes we calculate the additional drag on the sphere due to the presence of the containing walls of the cylinder and the upper free surface of the liquid. Good agreement with experimental data and with analytical calculations is obtained for a range of ball sizes. Our findings indicate that the finite element method is an accurate computational technique for solving this class of multiphase hydrodynamics problems.

49101 **(UCRL—94277) 2D Lagrange MHD code.** Tipton, R.E. (Lawrence Livermore National Lab., CA (USA)). Jul 1986. Contract W-7405-ENG-48. 10p. (CONF-860703—26). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014440.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

An MHD model has been implemented on a 2D Lagrangian mesh with cylindrical symmetry. The magnetic diffusion equations for both B/sub θ/ and B/sub r'/, B/sub z/ are solved. The code has been used to model several simple experiments involving induced currents in conducting rings. The calculated results have been compared with the experimental data. The goal of this research is to develop a detailed computational model to aid in the design of High Explosive Generators. 8 refs., 3 figs.

49102 **(UCRL—94800) Direct computation of wall bounded aerosol turbulent flow interactions.** Buckingham, A.C. (Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 16p. (CONF-8609116—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013221.

From 3. international conference on numerical methods for non-linear problems; Dubrovnik, Yugoslavia (15 Sep 1986).

A method is described for direct numerical simulations of the statistical interactions between spherical solid particles and a turbulent carrier gas that entrains them. At the present stage of method development, the emphasis is on analysis of wall bounded turbulent, two phase, compressible flow. The bounding geometry described here is a two dimensional channel. The numerical procedure is designed to resolve statistical flow features of both dispersed and continuous phases. The numerical simulations combine a truncated spectral transform collocation procedure for the continuous phase with a Monte Carlo Lagrangian procedure for the dispersed phase. The continuous phase is iteratively matched at discrete time intervals to a random-walk Lagrangian statistical sampling procedure for the dispersed phase momenta and position expectancies. Ensemble averaging produces statistical velocity moments for both dispersed and continuous phases. 20 refs., 8 figs.

49103 **Desingularization of periodic vortex sheet roll-up.** Krasny, R. (Courant Institute of Mathematical Sciences, New York University 251 Mercer Street, New York, New York 10012). *Journal of Computational Physics;* **65**: No. 2, 292-313(Aug 1986).

The equations governing periodic vortex sheet roll-up from analytic initial data are desingularized. Linear stability analysis shows that this diminishes the vortex sheet model's short wavelength instability, yielding a numerically more tractable set of equations. Computational evidence is presented which indicates that this approximation converges, beyond the critical time of singularity formation in the vortex sheet, if the mesh is refined and the smoothing parameter is reduced in the proper order. The results suggest that the vortex sheet rolls up into a double branched spiral past the critical time. It is demonstrated that either higher machine precision or a spectra filter can be used to maintain computational accuracy as the smoothing parameter is decreased. Some conjectures on the model's long time asymptotic state are given.

49104 **FLIP: A method for adaptively zoned, particle-in-cell calculations of fluid in two dimensions.** Brackbill, J.U.; Ruppel, H.M. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Computational Physics;* **65**: No. 2, 314-343(Aug 1986).

A method is presented for calculating fluid flow in two dimensions using a full particle-in-cell representation on an adaptively zoned grid. The method has many interesting properties, among them an almost total absence of numerical dissipation and the ability to represent large variations in the data. The method is described using a standard formalism and its properties are illustrated by supersonic flow over a step and the interaction of a shock with a thin foil.

49105 **Velocity of propagation of the ^{3}He-A-italic-B-italic interface in hypercooled ^{3}He-A-italic.** Buchanan, D.S.; Swift, G.W.; Wheatley, J.C. (Condensed Matter and Thermal Physics Group, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). **57**: No. 3, 341-344(21 Jul 1986).

We have measured the velocity of propagation of the ^{3}He A-italic-B-italic interface as a function of temperature and pressure for the ^{3}He-A-italic initially in a hypercooled state. Velocities as high as 67 cm/s have been observed. Nucleation of the A-italic phase occurred at greatly different temperatures in two different regions of the experimental cell.

49106 **Fourier path integral methods: A model study of simple fluids.** Freeman, D.L.; Coalson, R.D.; Doll, J.D. (Department of Chemistry, University of Rhode Island, Kingston, Rhode Island 02881). **43**: No. 3, 931-934(Jun 1986).

The free energy of normal liquid helium is calculated. (AIP)

49107 **Simplified kinetic treatment of heavy molecule velocity persistence effects: application to species separation.** de la Mora, J.F.; Mercer, J.; Rosner, D.E.; Fenn, J.B. (Yale Univ., New Haven, CT). **74**: 617-626(1981). Contract FG01-78ET11384.

From 12. international symposium on rarefied gas dynamics; Charlottesville, VA, USA (7-11 Jul 1980).

A formalism is supplied to account for inertial non-equilibrium in dilute mixtures of heavy molecules in a light bath. It is shown that the usual local gradient flux laws are not valid in situations typical of aerodynamic species separation experiments. A more general framework, including the inertia of the heavy species, is introduced based on a Fokker-Planck kinetic equation, which the authors solve approximately for the two-dimensional stagnation point flow prevailing in the opposed jet geometry. The predictions compare favorably with available experiments and, on the basis of this formulation, specific recommendations for future experiments are made. 12 references, 3 figures.

6450 High Energy Physics

REFER ALSO TO CITATION(S) 48389

6451 Particle Interactions And Properties - Experimental

REFER ALSO TO CITATION(S) 48337, 48338, 48340, 48388, 48467, 49148, 49150, 49232, 49244, 49617

49108 **(ANL—85-22, pp 8) Electroproduction of the delta isobar in nuclei.** Geesaman, D.F.; Green, M.C.; Holt, R.J.; Jackson, H.E.; Kowalczyk, R.S.; Lee, T.S.H.; Schiffer, J.P.; Zeidman, B. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A study of the electroproduction of the delta isobar in complex nuclei has been proposed and approved at the Stanford Linear Accelerator (SLAC). The 1.6-GeV and 8-GeV spectrometers will be used to investigate the scattering of medium-energy electrons (T/sub e/ = 0.5 to 2.0 GeV) by targets of ^{12}C and ^{56}Fe. The particular feature to be studied in this experiment will be the separation of the longitudinal and transverse cross sections at relatively low four-momentum transfer, $q^2 \sim 0.1$ $(GeV/c)^2$, where the kinematic conditions correspond to those obtained in pion excitation of the delta.

49109 **(ANL—85-22, pp 34-35) Neutrino oscillations at LAMPF.** Carlini, R.; Choi, C.; Donohue, J.; Fazely, A.; Freedman, S.J.; Fujikawa, B.; Garvey, G.T.; Green, M.; Harper, R.; Imlay, R.; Lesko, K. (Los Alamos National Lab., NM). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Work at Argonne continues on the construction of the neutrino oscillation experiment (E645). Construction of detector supports and active shield components were completed at the Provo plant of the principal contractor for the project (the Pittsburgh-Des Moines Corporation). Erection of the major experimental components was completed at the LAMPF experimental site in mid-March 1985. Work continues on the tunnel which will house the

detector. Construction of detector components (scintillators and proportional drift tubes) is proceeding at Ohio State University and Louisiana State University. Consolidation of these components into the 20-ton neutrino detector is beginning at LAMPF.

49110 (ANL—85-22, pp 37) **Neutron beta decay.** Freedman, S.J.; Bopp, P.; Dubbers, D.; Honig, L.; Klempt, E.; Last, J.; Schaerp, O. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Data acquisition on the neutron β-decay experiment was accomplished during three six-week reactor cycles during 1983. The experiment runs were completed on October 4, 1983; the reactor is now shut down for a year of refitting.

49111 (ANL—85-22, pp 41-42) **Search for super-heavy particles in cosmic rays.** Dawson, J.; Freedman, S.J.; Gobbi, B.; Kroupa, M.; Napolitano, J. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Magnetic monopoles with masses on the order of 10^{16} GeV/c^2 are predicted by Grand Unified field theories. Some astrophysical predictions of production rates of these objects in the early universe suggest an observable abundance in the present universe. Our search for these heavy magnetic monopoles consists of a layered array of large-area plastic-scintillator counters with a geometrical factor of 3.8 m^2-ster. These counters, used previously in a search for low ionization by fractionally charged particles, are sensitive to single photons or about 1.5% of the ionization of single minimum-ionizing particles. In a series of runs with a total active time of 230 days the authors observed no candidate events and can assign a 90% confidence limit of 4.1 x $_{10}$-12/cm^2-s-sr to the flux of these particles at the earth's surface for highly ionizing particles.

49112 (ANL—85-22, pp 44-45) **Measurement of the electric dipole moment of the neutron.** Freedman, M.S.; Ringo, G.R.; Dombeck, T.W.; Carpenter, J.M.; Jarmie, N.; Lynn, J.W.; Moses, J.D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The purpose of this project is to measure the electric dipole moment (EDM) of the neutron. Such a measurement would probably constitute the most sensitive test of time-reversal symmetry now available. The present situation is that with about a factor-of-10 improvement in sensitivity, a whole class of gauge theories - those which explain CP failure by introducing a new scalar field - can be given a definitive test. Since the measurement of the neutron EDM is fundamentally a frequency measurement, its statistical uncertainty is inversely proportional to the duration of the measurement. It is therefore natural to try the measurement on ultracold neutrons (UCN). The present state of the project is that the basic experimental ideas have been tested and shown to be practical, as have several other ideas for enhancing the production of UCN, such as the use of reflectors around the moving crystal and funnels to concentrate the UCN in real space at the expense of their concentration in velocity space. Although it was originally planned to do the experiment at IPNS, difficulties with cold moderators and the availability of a higher flux source at Los Alamos have caused us to move the experiment there.

49113 **(ANL-HEP-CP—86-47) Soudan 2 nucleon decay experiment.** Thron, J.L. (Argonne National Lab., IL (USA)). 1986. Contract W-31-109-ENG-38. 13p. (CONF-8604202—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014578.

From 7. workshop on grand unification; Toyama City, Japan (16 Apr 1986).

The Soudan 2 nucleon decay experiment consists of a 1.1 Kton fine grained iron tracking calorimeter. It has a very isotropic detection structure which along with its flexible trigger will allow detection of multiparticle and neutrino proton decay modes. The detector has now entered its construction stage.

49114 **(ANL-HEP-CP—86-76) SSC physics signatures and trigger requirements.** (Argonne National Lab., IL (USA)). 1985. Contract W-31-109-ENG-38. 23p. (CONF-8511150—10). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014606.

From Workshop on triggering, data acquisition and computing for high energy/high luminosity hadron-hadron colliders; Batavia, IL, USA (11 Nov 1985).

Strategies are considered for triggering on new physics processes on the environment of the SSC, where interaction rates will be very high and most new physics processes quite rare. The quantities available for use in the trigger at various levels are related to the signatures of possible new physics. Two examples were investigated in some detail using the ISAJET Monte Carlo program: Higgs decays to W pairs and a missing energy trigger applied to gluino pair production. In both of the examples studied in detail, it was found that workable strategies for reducing the trigger rate were obtainable which also produced acceptable efficiency for the processes of interest. In future work, it will be necessary to carry out such a program for the full spectrum of suggested new physics.

49115 **(BNL—38285) Antinucleon physics.** Dover, C.B. (Brookhaven National Lab., Upton, NY (USA). Physics Dept.). 1986. Contract AC02-76CH00016. 22p. (CONF-860575—23). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013913.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

Some of the recent data from LEAR, Brookhaven, and KEK on low and medium energy interactions of antinucleons (anti N) with nucleons (N) are reviewed and interpreted. Emphasis is on elastic and charge exchange scattering, total cross sections, and studies of anti NN annihilation, with particular focus on the emerging evidence for broad resonances and/or bound states of the anti NN system and the selection rules which reveal the quuark-gluon dynamics of the annihilation process. 69 refs., 8 figs.

49116 **(BNL—38304) Spin effects in exclusive reactions at high P/sub perpendicular/.** Makdisi, Y. (Brookhaven National Lab., Upton, NY (USA). AGS Dept.). 1986. Contract AC02-76CH00016. 6p. (CONF-860575—29). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014131.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

Production and decay angular distributions from the process $\pi^- p \rightarrow rho^- p$ at 90° in the center-of-mass are presented. A large spin flip amplitude is observed, the ramifications of which are noted in the contex of the known theories.

49117 **(BNL—38385) Search for the ξ(2.2) in anti pp formation.** Christenson, J.H.; Kreiter, G.A.; Nemethy, P.; Sculli, J.; Yamin, P. (New York Univ., NY (USA). Dept. of Physics; Brookhaven National Lab., Upton, NY (USA). AGS Dept.). 1986. Contract AC02-76CH00016. 9p. (CONF-860701—7). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014167.

From 23. international conference on high-energy physics; Berkeley, CA, USA (16 Jul 1986).

The results are reported of a search at the Brookhaven National Laboratory AGS for the ξ(2.2) with a mass resolution of 3 MeV/c^2. Thirty-seven thousand events of the form anti pp $\rightarrow$ K^+K^- and two hundred thousand events of the form anti pp $\rightarrow$ $\pi^+\pi^-$ were studied in the incident momentum interval from 1.25 GeV/c to 1.56 GeV/c, corresponding to a mass interval of 110 MeV/c^2 about the reported ξ mass.

49118 **(CEA-CONF—8014) Elastic and inelastic scattering of antiprotons.** Lemaire, M.C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)). Jun 1984. 26p. (CONF-8506162—3; DPh-N-S—2282). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750849.

From Symposium on medium energy nucleon and antinucleon scattering; Bad Honnef, F.R. Germany (18 Jun 1985).

During the last two years very interesting results have been collected at LEAR on both the elementary p anti p and the anti p

nucleus interactions. A review of all the interesting experimental results already available is far beyond the scope of the present talk. Its topic will be essentially limited to report on the new experimental informations dealing with the knowledge of the fundamental properties of the anti p p elementary interaction and the determination of the characteristics of the anti p nucleus interaction. The results of the anti p p cross sections measured at low momenta by the PS173 and PS172 experiments are discussed. The anti p nucleus elastic scattering angular distributions collected by the PS184 experiment have significantly contributed to define the properties of the p nucleus optical potential and stimulated a lot of microscopic calculations. The results are reviewed. A comparison to the informations obtained from the measurements of X-rays in anti protonic atoms done by the PS176 and PS186 experiments is given. The interpretation of the inelastic scattering data measured for the ^{12}C(anti p, anti p)$^{12}C^*$ system at 47 and 180 MeV for various discrete states is presented: special emphasis will be given to the study of spin-flip transitions to unnatural parity states which would provide significant constant on the isovector tensor component of the N anti N interaction. Status on the experimental study of the (anti p, p) reaction is discussed.

49119 (CEA-N—2442) Study of the quark fragmentation in charged current ν and anti ν interactions of deuterium. Bolognese, T. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF); Paris-11 Univ., 91 - Orsay (France)). Oct 1985. 207p. (In French). NTIS (US Sales Only), PC A10/MF A01. File Number DE86750858.

In this work we present some results obtained in the framework of the WA25 experiment which studies the neutrino and antineutrino interactions on the bubble chamber BEBC filled with deuterium. We have analysed the general properties of the hadrons produced. The fragmentation of the "u" and "d" quarks and the "uu", "ud", "dd" diquark systems have been studied and compared with the Lund model predictions. We have studied the Q^2 and W^2 dependence of the fragmentation functions obtained in the ν(anti ν) D_2 (WA25) and the ν(anti ν) Ne (WA47) experiments and compared it to the predictions of the quantum chromodynamics (QCD). A detailed analysis of the transverse momentum of hadrons allowed us to clarify the effects due to the quark primordial transverse momentum, the soft gluon production, and the perturbative effects predicted by QCD. We finally selected a small sample of 3 jets candidate events which may due to the fragmentation of a hard gluon.

49120 (CERN—86-02-Vol.1) Physics at LEP. Vol. 1. Ellis, J.; Peccei, R. (eds.). (European Organization for Nuclear Research, Geneva (Switzerland)). 21 Feb 1986. 440p. NTIS (US Sales Only), PC A19/MF A01. File Number DE86703236.

This report surveys physics which may be investigated at LEP, the Large Electron-Positron collider under construction at CERN. Five general areas are emphasized, namely: precision measurements at the Z^0 peak; studies of toponium; searches for possible new particles; QCD, $\gamma\gamma$, and heavy quark studies; and experiments at the highest LEP energies up to and beyond the W^+W^- pair-production threshold. Wherever possible, full cross section formulae are given, together with references to the original literature where more details may be found.

49121 (CERN—86-02-Vol.2) Physics at LEP. Vol. 2. Ellis, J.; Peccei, R. (eds.). (European Organization for Nuclear Research, Geneva (Switzerland)). 21 Feb 1986. 318p. NTIS (US Sales Only), PC A14/MF A01. File Number DE86703237.

This report surveys physics which may be investigated at LEP, the Large Electron-Positron collider under construction at CERN. Five general areas are emphasized, namely: precision measurements at the Z^0 peak; studies of toponium; searches for possible new particles; QCD, $\gamma\gamma$, and heavy quark studies; and experiments at the highest LEP energies up to and beyond the W^+W^- pair-production threshold. Wherever possible, full cross section formulae are given, together with references to the original literature where more details may be found.

49122 (DOE/ER/03509—22) [Research in elementary particle physics]. Progress report, August 1, 1985-July 31, 1986. Lannutti, J.E. (Florida State Univ., Tallahassee (USA). Dept. of Physics). 1986. Contract AS05-76ER03509. 56p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014676.

The experimental effort reported was divided between fixed target physics and preparation for future collider experiments. Experiments include di-hadron high p/sub t/ inclusive production, E/ iota decay, work in preparation for the DO collider experiment (particularly building the central uranium calorimeter, software and electronics development, and beam testing and calibration), and generation of Monte Carlo events for the CERN ALEPH collider experiment. A theoretical program is also reported which includes the phenomenology of strong and electroweak interactions and Monte Carlo simulations of various field theories. (LEW)

49123 (DOE/ER/40048—163-L6) Parity and time-reversal violation in nuclei and atoms. Adelberger, E.G. (Washington Univ., Seattle (USA). Nuclear Physics Lab.). 1986. Contract AC06-81ER40048. 12p. (CONF-860575—21). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013146.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

Two topics are briefly reviewed: the parity (P)-violating NN interaction and the time-reversal (T) and P-violating electric moments (EDM's) of atoms. The $\Delta I = 1$ P-violating NN amplitude dominated by weak π^{+-} exchange is found to be appreciably smaller than bag-model predictions. This may be a dynamical symmetry of flavor-conserving hadronic weak processes reminiscent of the $\Delta I = 1/2$ rule in flavor-changing decays. General principles of experimental searches for atomic EDM's are discussed. Atomic EDM's are sensitive to electronic or nuclear EDM's and to a P-and-T-violating electron-quark interaction. Even though the experimental precision is still $\sim 10^4$ times worse than counting statistics, the recent results have reached a sensitivity to nuclear EDM's which rivals that of the neutron EDM data. Further significant improvements can be expected. 17 refs., 4 figs.

49124 (FNAL/C—86/102-E) Azimuthal energy flow in deep inelastic neutrino scattering. Mukherjee, A.; Bofill, J.; Busza, W.; Eldridge, T.F.; Friedman, J.I.; Fuess, S.; Goodman, M.C.; Kendall, H.W.; Lyons, T.F.; Magahiz, R.A. (Massachusetts Inst. of Tech., Cambridge (USA); Fermi National Accelerator Lab., Batavia, IL (USA); Michigan State Univ., East Lansing (USA); Florida Univ., Gainesville (USA)). 12 Jun 1986. Contract AC02-76CH03000. 16p. (CONF-860701—8). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014372.

From 23. international conference on high-energy physics; Berkeley, CA, USA (16 Jul 1986).

Gluon emission and the transverse momentum (p/sub t/) of partons confined in nucleons were studied using deep-inelastic charged-current neutrino-nucleon interactions. For this analysis we use the flow of hadronic energy in the azimuthal direction around the momentum transfer referenced from the neutrino-muon scattering plane. A five standard deviation asymmetry was found. Analysis of this asymmetry indicates a (p/sub t/) of 0.35 +- 0.12 GeV/c if QCD corrections are included, and 0.56 +- 0.05 GeV/c if they are excluded. Some evidence was also observed for x dependence in p/sub t/. Data were taken at Fermilab in 1982 using a 200 ton (fiducial mass) fine grained calorimeter and a dichromatic neutrino beam.

49125 (INIS-mf—10179) Study of the production of hadrons in muon-proton reactions at 280 GeV at the CERN proton synchrotron. Dengler, F. (Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet fuer Physik). 28 Feb 1985. 165p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE86752579.

In the experiment NA9 of the European Muon Collaboration EMC for the first time in a muon experiment at high energies the possibility is offerred to detect all final-state hadrons and to measure their momentum. About a third of the particles can be identi-

fied beyond by means of Cherenkov and time-of-flight counters. By the measurement of the incoming and the scattered muon the kinematical variables of each event are determined. By application of a detailed simulation of the NA9 spectrometer on events from the Lund Monte-Carlo program the systematic errors and losses of the experiment were estimated, and the data were corrected on these errors and losses. In the analysis of the multiplicities of charged hadrons it was stated that known properties like KNO scaling behaviour and a logarithmic increase of the mean multiplicities with the hadronic c.m. energy W are also observed in this experiment. Furthermore by study of the correlation of the multiplicities in the forward and backward hemisphere and by means of the charge distribution as function of the rapidity it was shown that the assumption is justified at the energies of this experiment that the fragmentation processes in the forward and backward jet proceed independently. Effects were found which are to be explained in the quark-parton model: The dependence of the mean charge of the forward jet on W^2 and Bjorken x can only be understood if the contribution (40%) of events by scattering on sea quarks is regarded in this experiment. An estimation of this contribution to the mean charge of the forward jet by means of the quark distribution functions led to a good agreement with the data.

49126 **(INIS-mf—10196) Hamburg University, 2. Institute of Experimental Physics. Annual report 1985.** (Hamburg Univ. (Germany, F.R.). 2. Inst. fuer Experimentalphysik). Dec 1985. 64p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752585.

This annual report contains short descriptions of the work performed at the named institute together with a list of publications, contributions to conferences, dissertations, and diploma theses. The work concerns nuclear structure studies by hyperfine structure, experiments with synchrotron radiation, experiments at CERN, e^+e^- interactions at PETRA, and muon-nucleon interactions.

49127 (LA—10655-C, pp 41-62) **Neutrino electron scattering at LAMPF.** White, D.H. (Brookhaven National Lab., Upton, NY). Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

A major accomplishment in elementary particle physics in the last fifteen years has been the success of the electroweak model of Glashow, Weinberg, and Salam in describing the unification of the electromagnetic and weak forces. The theory explains the experimental facts within the precision with which they are known in terms of a single phenomenological parameter. Many deeper uncertainties remain, particularly the origin of the masses of the intermediate vector bosons, but here the authors shall consider the limits of applicability of the standard model assuming that verifying the theory is a worthwhile goal and that exposing limitations of the theory may cast light on the deeper aspects, which are yet speculative. The theory is described below from an experimenter's point of view, with heavy emphasis on the observables, including a summary of the present experimental situation and a proposal for a new measurement of theta/sub W/ at LAMPF.

49128 (LA—10655-C, pp 63-94) **Searching for muon number violating at LAMPF: current results and future prospects.** Cooper, M.D. Feb 1986. NTIS, PC A10/MF A01. File Number DE86008572.

In Proceedings of the nineteenth LAMPF Users Group meeting.

The experimental status of rare decays that violate muon number conservation is summarized. These results represent an international effort in this active field, with experiments at laboratories in the United States, Switzerland, Canada, and the Soviet Union. Substantial improvements over the data of two years ago are shown that demonstrate the present knowledge for the four muon processes. As many of these experiments are still running or coming into operation, immanent progress to the level stated in column four is expected. The last column shows that new experiments are being planning now that should yield results around 1990. This paper will focus on the present and future prospects for the decays $\mu^+ \to e^+\gamma$ and $\mu^+ \to e^+\gamma\gamma$ that are being pursued at LAMPF. The experimental apparatus is described.

49129 **(LBL—21716) Direct lepton production in hadronic and nuclear collisions at low p/sub t/ and low pair mass.** Roche, G. (Lawrence Berkeley Lab., CA (USA)). Jun 1986. Contract AC03-76SF00098. 10p. (CONF-860575—22). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013472.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

A brief review of the direct production of single leptons and dileptons in hadronic collisions at low p/sub t/ and low pair mass is given. Several open questions are pointed out and the universality of lepton production is briefly discussed. The Bevalac Di-Lepton Spectrometer project is presented. 25 refs., 5 figs.

49130 **(RRK—85-3) Unconstrained multiplet in N=2 conformal supergravity.** Hayashi, Masahito; Uehara, Shozo. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics; Kyoto Univ. (Japan). Dept. of Physics). Feb 1985. 42p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703139.

An unconstrained (general) multiplet was studied in N = 2 conformal supergravity. Transformation law, embedding formula and multiplication rule are explicitly presented at the linearized level.

49131 **(SLAC—300) Measurement of the average lifetime of hadrons containing bottom quarks.** Klem, D.E. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jun 1986. Contract AC03-76SF00515. 73p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86014070.

Thesis.

This thesis reports a measurement of the average lifetime of hadrons containing bottom quarks. It is based on data taken with the DELCO detector at the PEP e^+e^- storage ring at a center of mass energy of 29 GeV. The decays of hadrons containing bottom quarks are tagged in hadronic events by the presence of electrons with a large component of momentum transverse to the event axis. Such electrons are identified in the DELCO detector by an atmospheric pressure Cherenkov counter assisted by a lead/scintillator electromagnetic shower counter. The lifetime measured is 1.17 psec, consistent with previous measurements. This measurement, in conjunction with a limit on the non-charm branching ratio in b-decay obtained by other experiments, can be used to constrain the magnitude of the V/sub cb/ element of the Kobayashi-Maskawa matrix to the range 0.042 (+0.005 or -0.004 (stat.), +0.004 or -0.002 (sys.)), where the errors reflect the uncertainty on tau/sub b/ only and not the uncertainties in the calculations which relate the b-lifetime and the element of the Kobayashi-Maskawa matrix.

49132 **(SLAC-PUB—4026) J/psi results from Mark III.** Stockhausen, W. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jul 1986. Contract AC03-76SF00515. 7p. (CONF-8605162—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014475.

From International symposium on production and decay of heavy flavours; Heidelberg, F.R. Germany (19 May 1986).

Results from the Mark III collaboration on related hadronic and radiative decays of the J/psi are presented. From a data sample of 5.8 million produced J/psi decays disintegrations into either γ, ω, or phi plus K anti K, K anti Kπ, eta$\pi\pi$ or $\pi\pi$ are studied. These results are valuable in the understanding of the nature and composition of the 2^{++} θ(1720) and the 0^{-+} iota(1440), the primary candidates for gluonic matter.

49133 **Forward-angle cross sections for pion-nucleon charge exchange between 100 and 150 MeV/c-italic.** Fitzgerald, D.H.; Baer, H.W.; Bowman, J.D.; Cooper, M.D.; Irom, F.; King, N.S.P.; Leitch, M.J.; Piasetzky, E.; Briscoe, W.J.; Sadler, M.E.; Smith, K.J.; Knudson, J.N. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). **34:** No. 2, 619-626(Aug 1986).

The differential cross sections for the πN charge-exchange reaction, $\pi^-p \to \pi^0 n$, have been measured in an angular range corresponding to 0.99> or =cost-italich-italice-italict-italica-italic/sub c.m./> or =0.90 at 100.6, 106.7, 113.4, 125.2, 130.9, 136.4, and

147.1 MeV/c-italic. A striking feature of the charge-exchange reaction at forward angles is the presence of a deep minimum near 120 MeV/c-italic, caused by interference between s-italic- and p-italic-wave scattering. The parameters of this minimum, of interest both intrinsically and for applications to π-nucleus single- and double-charge-exchange reactions, are well determined by the measurements. Our data are compared with the results of existing partial-wave analyses, and the data are discussed in terms of the isospin-odd, s-italic-wave scattering length, a-italic$_1$-a$_3$.

49134 Measurement of elastic electron scattering from the proton at high momentum transfer. Arnold, R.G.; Bosted, P.E.; Chang, C.C.; Gomez, J.; Katramatou, A.T.; Martoff, C.J.; Petratos, G.G.; Rahbar, A.A.; Rock, S.E.; Sill, A.F.; Szalata, Z.M.; Sherden, D.J.; Lambert, J.M.; Lombard-Nelsen, R.M. (Department of Physics, The American University, Washington D.C. 20016). 57: No. 2, 174-177(14 Jul 1986).

We have performed absolute measurements of the differential cross section for elastic e-italic-p-italic scattering in the range of momentum transfer from Q-italic^2 = 2.9 to 31.3 (GeV/c-italic)^2. Combined statistical and systematic uncertainties in the cross-section measurements ranged from 3% at low Q-italic^2 to 19% at high Q-italic^2. These data have been used to extract the proton magnetic form factor G-italic/sub M-italic//sup p-italic/(Q^2). The results show a smooth decrease of Q-italic^{4}G/sub M//sup p/ with momentum transfer above Q-italic^2 = 10 (GeV/c-italic)^2. These results are compared with recent predictions of perturbative QCD.

49135 Determination of the neutrino fluxes in the Brookhaven wide-band beams. Ahrens, L.A.; Aronson, S.H.; Connolly, P.L.; Gibbard, B.G.; Murtagh, M.J.; Murtagh, S.J.; Terada, S.; White, D.H.; Callas, J.L.; Cutts, D. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). 34: No. 1, 75-84(1 Jul 1986).

The neutrino fluxes phi(E-italic(ν/sub μ/)), phi(E-italic(nu-bar/sub μ/)), and phi(E-italic(ν/sub e-italic/)) in the Brookhaven Alternating Gradient Synchrotron wide-band beams have been determined by measurements of quasielastic interactions observed in a massive, high-resolution detector. These fluxes are accurately reproduced by Monte Carlo calculations.

49136 Study of the reaction p/sub up-arrow/p→pπ^+n with polarized beam from 3 to 12 GeV/c. Wicklund, A.B.; Arenton, M.W.; Ayres, D.S.; Diebold, R.; Kramer, S.L.; May, E.N.; Nodulman, L.J.; Sauer, J.R. (Argonne National Laboratory, Argonne, Illinois 60439). 34: No. 1, 19-41(1 Jul 1986). Contract W-31-109-ENG-38.

We present density-matrix elements and single-spin correlations for the reaction p/sub up-arrow/p→pπ^+n at 3, 4, 6, and 11.75 GeV/c, using both longitudinal and transverse beam polarizations. For small momentum transfers, the spin correlations are mainly due to off-shell π^+p elastic scattering, while for larger t-italic there are large polarization effects associated with the production dynamics for p/sub up-arrow/p→Δ/sup ++/n. Comparison of longitudinal and transverse polarization correlations suggests that the Δ/sup ++/-production spin effects are due mainly to unnatural-parity exchanges. We present a model-dependent amplitude analysis, and extract the energy dependence of the natural- and unnatural-parity-exchange contributions.

49137 Production of G(1590) and other mesons decaying into eta pairs by 100 GeV/c πp on protons. Alde, D.; Knapp, E.A.; Donskov, S.V.; Inyakin, A.V.; Kachanov, V.A.; Kakauridze, D.B.; Khaustov, G.V.; Kulik, A.V.; Lednev, A.A.; Mikhailov, Yu.V. (Los Alamos National Lab., NM, USA). 269: No. 2, 485-508(2 Jun 1986).

New data on the scalar G(1590) meson which decays into etaeta have been obtained in an experiment at the CERN SPS. eta pairs are detected with the electromagnetic calorimeter GAMS both through their decay into 4γ and into 8γ. epsilon(1300), f(1270), f(1525) as well as the spin-4 h(2030) mesons have also been observed to decay in the same mode. Their branching ratios have been evaluated. The presence of high-mass spin-O and spin-2 structures is discussed.

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REFER ALSO TO CITATION(S) 48349, 48349, 49115, 49119, 49122, 49196, 49205, 49212

49138 (ANL—85-22, pp 144) **Binding energies of hypernuclei and 3-body Λ NN forces.** Bodmer, A.R.; Usmani, Q.N. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors are continuing their variational calculations of the Λ-separation energies of the s-shell hypernuclei (/sub Λ/^{3}H, /sub Λ/^{4}He, /sub Λ/^{5}He) using Monte Carlo techniques, and also for a Λ in nuclear matter (the well depth D/sub Λ/) using the Fermi hypernetted chain approach. These calculations are in an advanced stage and are now nearing completion.

49139 (ANL—85-22, pp 145) **Coulomb effects and charge symmetry breaking for the Λ = 4 hypernuclei.** Bodmer, A.R.; Usmani, Q.N. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The effect ΔB/sub c/ of the Coulomb interaction on the LAMDA separation energy B/sub Λ/ of /sub Λ/^{4}He was obtained by variational calculations made for /sub Λ/^{4}He and ^{3}He. These calculations were made for several values of q^2 in the range $0 \leqq q^2 \leqq 9$ where q is the proton charge, i.e., the Coulomb repulsion was artificially boosted.

49140 (ANL—85-22, pp 145-146) **Alpha-cluster calculations of /sub Λ/^{9}Be.** Bodmer, A.R.; Usmani, Q.N. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Variational calculations are being continued for /sub Λ/^{9}Be, using a $2\alpha + \Lambda$ model. The best available local but l dependent $\alpha\alpha$ potentials (fitted to $\alpha\alpha$ phase shifts) are used. The $\alpha\Lambda$ potential is obtained by effective interaction calculations by folding effective Λ N and Λ NN potentials into the α-particle density to reproduce B/sub Λ/(/sub Λ/^{5}He). Λ NN Wigner forces also imply a repulsive $\alpha\alpha\Lambda$ potential.

49141 (ANL—85-22, pp 146) **Binding energies of Λ Λ hypernuclei and the Λ Λ interaction.** Bodmer, A.R.; Usmani, Q.N.; Carlson, J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The binding energies of the Λ Λ hypernuclei /sub Λ Λ/^{10}Be and /sub Λ Λ/^{6}He were calculated variationally with a $2\alpha + 2\Lambda$ and with an $\alpha + 2\Lambda$ model respectively. For /sub Λ Λ/α^{10}Be the integrations were made with Monte Carlo techniques while for /sub Λ Λ/^{6}He direct numerical methods were used. A wide range of phenomenological Λ Λ potentials based on meson-exchange models was considered.

49142 (ANL—85-22, pp 156) **Basic physics with magnetic monopoles.** Lipkin, H.J.; Peshkin, M. (Weizmann Institute of Science, Rehovoth, Israel). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The renewed interest in magnetic monopoles has called attention to peculiar problems arising in the application of conventional electrodynamics to systems containing both electric and magnetic charges. The authors are preparing a paper in which they identify the new physics issues involved when both kinds of charge are present, and they demonstrate paradoxes which arise when this new physics is neglected.

49143 (ANL—85-22, pp 156-158) **Constituent quark model for old and new particles.** Lipkin, H.J. (Weizmann Institute of Science, Rehovoth, Israel). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The model of baryons made of three constituent quarks and of mesons made of a quark-antiquark pair bound by the forces of quantum chromodynamics has been used to interpret and suggest new experiments to further the author's understanding of the structure of the old particles and help in the search for new particles. A series of lectures given at the Canadian Yukon Advanced Study Institute reviewed the general approach and present status and the notes have been written up for publication. In addition two papers were published describing the new research.

49144 **(CNRS-CPT—85-P-1776) Problem of "global color" in gauge theories.** Horvathy, P.A.; Rawnsley, J.H. (Centre National de la Recherche Scientifique, 13 - Marseille (France). Centre de Physique Theorique). Jun 1985. 16p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86750878.

The problem of "global color" (which arose recently in monopole theory) is generalized to arbitrary gauge theories: a subgroup K of the "unbroken" gauge group G is implementable if the gauge bundle reduces to the centralizer of K in G. Equivalent implementations correspond to equivalent reductions. Such an action is an internal symmetry for a given configuration if the Yang Mills field reduces also. The case of monopoles is worked out in detail.

49145 **(DESY—86-035) Gauss'-law and the infraparticle problem.** Bucholz, D. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.); Hamburg Univ. (Germany, F.R.). 2. Inst. fuer Theoretische Physik). Mar 1986. 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86752384.

It is shown that a state carrying an "electric" charge which can be determined with the help of Gauss' law cannot be an eigenstate of the mass operator. (orig.).

49146 **(DOE/ER/03992—557) Finite temperature corrections to the Van der Waals potential.** Chiu, C.B.; Dicus, D.A.; Joseph, K.B.; Teplitz, V.L. (Texas Univ., Austin (USA). Center for Particle Theory; Arms Control and Disarmament Agency, Washington, DC (USA). Strategic Affairs Div.; Maryland Univ., College Park (USA). Dept. of Physics). Jun 1984. Contract AS05-76ER03992. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014630.

Finite temperature corrections to the two photon exchange potential between polarizable systems are evaluated. A complex (additive) correction is found of the form: ReV/sup T/ $\sim 1/r$, ImV/sup T/ $\sim$ constant, for $r < 1/T$; and ReV/sup T/ $\sim 1/r^6$, ImV/sup T/ $\sim 1/r$, for $r > 1/T$. These results are to be compared with the Feinberg-Sucher zero temperature answer ReV/sup T=O/ $\sim 1/r^7$, ImV/sup T=O/identical to O. 9 refs.

49147 **(DOE/ER/03992—567) Factorization theorem for decaying spinning particles.** Dicus, D.A.; Sudarshan, E.C.G.; Tata, X. (Texas Univ., Austin (USA). Center for Particle Theory; European Organization for Nuclear Research, Geneva (Switzerland)). Oct 1984. Contract AS05-76ER03992. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014625.

It is demonstrated that the differential cross-section for multiparticle production via the production and subsequent decay of a heavy, spinning particle factorizes into a production piece and a decay piece provided we choose our kinematic variables properly and the parent decays into at least three particles. 11 refs.

49148 **(DOE/ER/03992—568) Is there a delta-delta-pi problem.** Dicus, D.A.; Teplitz, V.L. (Texas Univ., Austin (USA). Center for Particle Theory; Arms Control and Disarmament Agency, Washington, DC (USA). Strategic Affairs Div.; Maryland Univ., College Park (USA). Dept. of Physics). Oct 1984. Contract AS05-76ER03992. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014624.

Chew's dedication to the goal of solving the problem of strong interaction dynamics and his attention to all aspects of the problem are recalled. It is then pointed out that deduction of g/sub $\Delta\Delta\pi$/ from P33 πN inelastically appears to give a value significantly less than almost all theoretical calculations and review efforts to data to resolve this apparent discrepancy.

49149 **(DOE/ER/40105—572) Induced second-class form factors in Σp β-decay.** Carson, L.J.; Oakes, R.J.; Willcox, C.R. (Northwestern Univ., Evanston, IL (USA). Dept. of Physics and Astronomy; Argonne National Lab., IL (USA). High Energy Physics Div.). 1986. Contract AC02-83ER40105. 42p. (ANL-HEP-PR—85-99). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014809.

A study of induced second-class currents emerging as a consequence of broken SU(3) flavor symmetry Σ^- β-decay is presented. Working within the framwork of the MIT bag model, all form factors describing the $\Sigma^- \to n$ weak transition are calculated, including QCD vertex corrections to order α/sub s/. It is found that the weak-electric dipole form factor g_3 is suppressed by confinement effects to be approximately -0.1. This is shown to have a negligible effect on the electron asymmetry α/sub e/, and hence strengthens the case that recent data for α/sub e/ in Σ^- β-decay are consistent with Cabbibo model predictions. 21 refs., 5 figs., 4 tabs.

49150 **(DOE/ER/40201—1) Report on the 1985 DPF meeting.** (Oregon Univ., Eugene (USA)). 1985. Contract FG06-85ER40201. 20p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014708.

The workshop reported was held to investigate physics issues related to the proposed Superconducting Super Collider. Sessions addressed electroweak interactions, experiment and phenomenology beyond the Standard Model, quantum chromodynamics, hadron physics, theory beyond the Standard Model, and detectors and accelerators. A list of participants is provided, as is also a bibliography of recent papers by the participants. (LEW)

49151 **(INR—1943/6,7/PH/A) Quark and gluon jets in proton-antiproton interactions associated with large p perpendicular to photons.** Lukaszuk, L.; Szeptycka, M. (Institute of Nuclear Research, Warsaw (Poland)). 1982. 14p. Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland.

It is shown that the production of high p photons in proton-antiproton interactions may serve as a source of experimental information about the properties of gluon jets.

49152 **(INS—536) Composite models of 'elementary' particles and fields.** Terazawa, H. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1985. 49p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703137.

Composite models of "elementary" particles and fields, leptons, quarks, and gauge bosons (and also Higgs scalars, if any), are reviewed and discussed in a pedagogical way.

49153 **(INS—537) Derivation of mass relations for composite W* and Z* from effective Lagrangian approach.** Yasue, Masaki; Oneda, Sadao. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1985. 16p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703235.

In an effective-Lagrangian model with gauge bosons (W,Z,γ) and their neighboring spin J=1 composites (W*,Z*), we find relations among their masses, m sub(W), m sub(Z), m sub(W*) and m sub(Z*): m sub(W) m sub(W*) = cos theta m sub(Z) m sub(Z*) (as a generalization of m sub(W) = cos theta m sub(Z)) and m sub(W)^2 + m sub(W*)^2 + tan^2 theta m sub(W0)^2 = m sub(Z)^2 + m sub(Z*)^2 with m sub(W0) being the mass of W in the standard model provided that the system respects the SU(2) sub(L) x U(1) sub(Y) symmetry. W* and Z* are taken as the lowest-lying excited states belonging to an SU(2) sub(L)-triplet in the symmetric limit. The existence of W* coupling to the V-A current modifies the relation between G sub(F) and M sub(W) and that of Z* generates a new interaction of the (Jsup(em))^2-type as well as the deviation of sin theta sub(W) observed at low energies from the mixing angle sin theta in neutral-current interactions.

49154 (LBL—21695) Identifying heavy Higgs bosons. Cahn, R.N. (Lawrence Berkeley Lab., CA (USA)). Jun 1986. Contract AC03-76SF00098. 4p. (CONF-8605163—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013487.

From Workshop on physics simulation at high energies; Madison, WI, USA (5 May 1986).

Two techniques for identifying heavy Higgs bosons produced at SSC energies are discussed. In the first, the Higgs boson decays into ZZ, with one Z decaying into an e-pair or μ-pair and the other into a neutrino pair. In the second, the production of the Higgs boson by WW fusion is tagged by detecting the quarks that produced the bremsstrahlung virtual W's. The associated Higgs decay is identified by one leptonic and one hadronic decay. Both methods appear capable of finding a heavy Higgs boson provided the SSC design parameters are achieved. 16 refs., 2 figs., 2 tabs.

49155 (LPC—85-13) QCD at collider energies. Nicolaidis, A.; Bordes, G. (College de France, 75 - Paris. Lab. de Physique Corpusculaire). 1985. 20p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86750868.

We examine available experimental distributions of transverse energy and transverse momentum, obtained at the CERN p anti p collider, in the context of Quantum Chromodynamics. We consider: i) The hadronic transverse energy released during W^{+-} production. This hadronic transverse energy is made out of two components, a soft component which we parametrize using minimum bias events and a semihard component which we calculate from QCD. ii) The transverse momentum of the produced W^{+-}. If the transverse momentum (or the transverse energy) results from a single gluon jet we use the formalism of Dokshitzer-Dyakonov-Troyan, while if it results from multiple gluonic emission we use the formalism of Parisi-Petronzio. iii) The relative transverse momentum of jets. While for W^{+-} production quarks play an essential role, jet production at moderate psub(T) and present energies is dominated by gluon-gluon scattering and therefore we can study the Sudakov form-factor of the gluon. We suggests also how through a Hankel transform of experimental data we can have direct access to the Sudakov form-factors of quarks and gluons.

49156 (OUP—85-24) Low momentum penguin contributions in a chiral theory. Eeg, J.O. (Oslo Univ. (Norway). Fysisk Inst.). Nov 1985. 10p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703238.

It has been shown that penguin diagram contributions corresponding to u-quark loop momenta below a scale Asub(x) approximately= 1 GeV are enhanced and could at least partly explain the $\Delta I=1/2$ rule. Thus a previous calculation within the bag model is confirmed. The present calculation is performed within an effective chiral theory with pions and kaons coupled to quarks. It has been found that low momentum left-left loop contributions are important, while left-right contributions can be neglected.

49157 (OUP—86-03) Low momentum penguin loop contributions and the $\Delta I=1/2$ rule. Eeg, J.O. (Oslo Univ. (Norway). Fysisk Inst.). Feb 1986. 40p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703239.

Contributions to the penguin diagram due to low loop momenta are considered. Using a chiral effective field theory, including quarks coupling to pions and kaons, sizeable contributions from u-quark loop momenta below the chiral symmetry breaking scale are found. Thus a previous result obtained within the bag model is confirmed. It is concluded that the low momentum penguin loop contributions seem to improve the theoretical understanding of the $\Delta I=1/2$ rule. 39 refs.

49158 (OUP—86-07) Meson self-energy effects for $K^{+-} \to \pi^{+-}\gamma\gamma$ in a chiral theory. Eeg, J.O. (Oslo Univ. (Norway). Fysisk Inst.). Mar 1986. 20p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703234.

Bremsstrahlung-like pole diagrams for $K^{+-} \to \pi^{+-}\gamma\gamma$ are considered. By means of Ward-identities for the electromagnetic couplings involved, the sum of these diagrams are related to the meson self-energy, which is calculated within an effective chiral theory with mesons coupling to quarks. The branching ratio for $K^{+-} \to \pi^{+-}\gamma\gamma$ is estimated to be of order 10^{-6}, that is of the same order of magnitude as the experimental bound. Thus, the obtained result is at least one order of magnetude bigger than the result obtained a decade ago, based on the triangle diagran for $s \to d\gamma\gamma$. This process could therefore provide a test for the considered chiral model.

49159 (RRK—85-9) Axial weak currents in the Wess-Zumino term. Fujikawa, Kazuo. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Mar 1985. 23p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703138.

The conventional axial gauging of the Wess-Zumino term leads to the results which do not necessarily agree with the expectations on the basis of quark level Ward-Takahashi identities. This discrepancy arises from the fact that the quark level anomalous identities reflect the short distance structure of QCD, whereas the gauging of the Wess-Zumino term reflects the axial symmetry in the spontaneously broken chiral phase. The low energy theorem for axial weak fields is not sharply defined, in contrast to the case of vector fields where no such complications arise.

49160 (SLAC-PUB—4001) CP violation in B and D decays. Bigi, I.I. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jun 1986. Contract AC03-76SF00515. 8p. (CONF-8605162—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86012959.

From International symposium on production and decay of heavy flavours; Heidelberg, F.R. Germany (19 May 1986).

Non-leptonic B decays offer the best opportunity to discover the violation of CP invariance outside the neutral K system. Employing the Standard Model one predicts - with reasonable confidence - CP asymmetries of up to 20% (or even more in some cases). The branching ratios for the individual exclusive modes of interest are not expected to exceed the 10^{-3} level in most cases; the identification of such decays poses non-trivial problems. It is shown that by summing intelligently over appropriate classes of decays one can greatly enhance statistics without jeopardizing the signal. Data that contain 10^8 produced B mesons would allow meaningful searches for CP violation. It is noted that "New Physics" could lead to CP asymmetries in D^0 decays of order 1%. Due to higher branching ratios one can search for such effects in samples of 10^8 produced D mesons. 7 refs.

49161 (SLAC-PUB—4029) Anomalous dimensions of multiquark bound states. Ji, C.R. (Stanford Linear Accelerator Center, Menlo Park, CA (USA); Stanford Univ., CA (USA). Inst. of Theoretical Physics). Jul 1986. Contract AC03-76SF00515. 3p. (CONF-860575—33). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014470.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

The evolution of six-quark color-singlet state distribution amplitudes is formulated as an application of perturbative quantum chromodynamics to nuclear wave functions. We present a general method of solving the evolution equation for multiquark bound states and predict the asymptotic Q^2 slope for the deuteron charge form factor as a result.

49162 (SLAC-TN—86-3) Hadron cascade code, FLUKA82; setup and coupling with EGS4 at SLAC. Ranft, J.; Moehring, H.J.; Jenkins, T.M.; Nelson, W.R. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Apr 1986. Contract AC03-76SF00515. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014388.

This note describes a SLAC implementation of the FLUKA hadronic cascade code coupled with the EGS4 electromagnetic cascade code. As an example of the use of FLUKA-EGS, the momentum distribution of π^+ mesons produced by 18 GeV electrons striking a 0.3 r.l. beryllium target is calculated and successfully compared with the experimental results taken from the SLAC Users Handbook.

49163 Quark confinement and hadronic interactions. Lenz, F.; Londergan, J.T.; Moniz, E.J.; Rosenfelder, R.; Stingl, M.; Yazaki, K. (Swiss Institute for Nuclear Research (SIN), CH-5234 Villigen, Switzerland). *Annals of Physics (New York);* **170**: No. 1, 65-254(Aug 1986).

A study of quark models for many-hadron systems is presented. The starting point in the construction of these nonrelativistic models is a proper formal definition of the concept of color singlet and nonsinglet clusters in a multiquark system which respects the exchange symmetry of the quarks. This definition provides a natural way to impose saturation of the confining forces.

49164 New interaction for the enhancement of the ΔI-italic = (1/2) amplitude in weak decays. Ma, E. (Department of Physics, University of California, Davis, California 95616 and Department of Physics and Astronomy, University of Hawaii at Manoa, Honolulu, Hawaii 96822). **57**: No. 3, 287-289(21 Jul 1986).

The low-energy limit of superstring theory admits certain new quarks and scalar bosons. Their interaction with the known quarks may lead to a significant enhancement of the ΔI-italic = (1/2) amplitude in weak decays.

49165 Can the data from the CERN p-italicp-bar collider limit gaugino masses?. Baer, H.; Hagiwara, K.; Tata, X. (High Energy Physics Division, Argonne National Laboratory, Argonne, Illinois 60439;). **57**: No. 3, 294-297(21 Jul 1986). Contract W-31-109-ENG-38;FG06-85ER40224.

We show that the hadronic decays of the W-italic gaugino (W-italic-tilde) and Z-italic gaugino (Z-italic-tilde) produced via each of the processes W-italic→W-italic-tildegamma-tilde, W-italic→W-italic-tildeZ-italic-tilde, and Z-italic°W-tildeW-tilde lead to a substantial monojet and dijet + missing p-italic/sub T-italic/ rate at the CERN collider. If the latter two decays are kinematically allowed, one should expect a comparable number of spectacular dilepton and trilepton events with little hadronic activity. In addition, there would also be jet + lepton + missing p-italic/sub T-italic/ signals. Absence of such signals could lead to the most stringent direct experimental limits on W-italic-tilde and Z-italic-tilde masses currently possible.

49166 Neutral-meson-antimeson mixing for a heavy isosinglet quark constituent. Barger, V.; Phillips, R.J.N.; Whisnant, K. (Physics Department, University of Wisconsin, Madison, Wisconsin 53706). **57**: No. 1, 48-50(7 Jul 1986).

If there exists a heavy isosinglet h-italic quark that mixes with the d-italic quark in the weak eigenstates, then the neutral meson H-italic°(hd-bar) can mix maximally with its antiparticle H-bar°(h-bard) through lowest-order flavor-changing neutral currents regardless of how small the h-italic-d-italic mixing angle may be. The H-italic°-H-bar° mixing parameter ϵ depends essentially on the H-italic° mass; for m-italic/sub H-italic/ <25 GeV, ϵ can be as large as 0.4.

49167 Radiative corrections to the ratio of Z- and W-boson production. Dicus, D.A.; Willenbrock, S.S.D. (Center for Particle Theory and Theory Group, University of Texas, Austin, Texas 78712). **34**: No. 1, 148-154(1 Jul 1986).

We calculate the order-α/sub s-italic/ ² corrections to Z-boson production in p-italicp-bar collisions for which there are no corresponding corrections to W-boson production. These corrections affect the ratio of Z- and W-boson production, a quantity which is useful for counting the number of species of neutrinos. We find that these corrections are much smaller than the uncertainty in the ratio stemming from the quark and gluon distribution functions and the value of Λ/sub QCD/.

49168 Cross section for four-gluon production by gluon-gluon fusion. Parke, S.J.; Taylor, T.R. (Fermi National Accelerator Lab., Batavia, IL, USA). **269**: No. 2, 410-420(2 Jun 1986).

The cross section for two-gluon to four-gluon scattering is given in a form suitable for fast numerical calculations.

49169 QCD radiative corrections to parton-parton scattering. Ellis, R.K.; Sexton, J.C. (Fermi National Accelerator Lab., Batavia, IL, USA). **269**: No. 2, 445-484(2 Jun 1986).

We present the matrix elements squared for all (2->2) and (2->3) parton scattering subprocesses calculated at O(αsub(s)³). The matrix elements are presented in n dimensions to regulate singularities due to the emission of soft or collinear radiation. We use these results to discuss one-hadron inclusive scattering, considering only a limited number of parton subprocesses. A preliminary analysis is made of the implications of our results for gluon-gluon scattering in the absence of quarks.

6453 Particle Invariance Principles And Symmetries

REFER ALSO TO CITATION(S) 49123, 49164, 49180, 49195, 49199, 49201, 49202, 49219

49170 (CEA-CONF—7938) Dynamical supersymmetry breaking. Affleck, I. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Mar 1985. 10p. (CONF-850375—24; SPh-T—85-062). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750871.

From 20. Recontre de Moriond; Les Arcs, France (10 Mar 1985).

Supersymmetry, and in particular, dynamical supersymmetry breaking, offers the hope of a natural solution of the gauge hierarchy problem in grand unification. I briefly review recent work on dynamical supersymmetry breaking in four-dimensional Higgs theories and its application to grand unified model building.

49171 (LA-UR—86-2540) Test of time reversal symmetry with resonance neutron scattering. Bowman, J.D. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 5p. (CONF-860575—26). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013831.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

The possibility of searching for time-reversal symmetry violation in the scattering of epithermal neutrons from nuclei is discussed. Sources of both statistical and systematic errors are reviewed. A qualitative assessment of the size of the time reversal is made and a schematic design of an experiment to test time reversal symmetry is presented. (DWL) 10 refs., 1 fig.

49172 (OUP—83-31) Fermionic vacuum fluctuations between chiral plates. Luetken, C.A.; Ravndal, F. (Oslo Univ. (Norway). Fysisk Inst.; Texas Univ., Austin (USA). Dept. of Physics). Aug 1983. 20p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703240.

As a primitive model of spontaneous breakdown of chiral symmetry for strongly interacting quarks, confined fermions between parallel plates have been considered. The massless fermion field satisfies the chiral MIT boundary conditions. Explicit expressions for the fermion condensate and the vacuum expectation value of the energy-momentum tensor are obtained.

49173 Phenomenologically consistent discrete symmetries in superstring theories. Joshipura, A.S.; Sarkar, U. (Institute of Mathematical Sciences, Madras 600113, India). **57**: No. 1, 33-36(7 Jul 1986).

The light matter supermultiplets are specified uniquely in most superstring theories when compactified on Calabi-Yau manifolds. It is pointed out that the discrete symmetries considered earlier in these models cannot give rise to a phenomenologically consistent fermion mass spectrum and suppress fast proton decay. We propose here a simple model which demonstrates the type of discrete symmetries one has to look for to make the superstring theories phenomenologically acceptable. Some interesting consequences of the model are pointed out.

49174 Two-photon decay widths of Higgs bosons in minimal broken supersymmetry. Bates, R.; Ng, J.N.; Kalyniak, P. (Theory Group, TRIUMF, 4004 Wesbrook Mall, Vancouver, British Columbia, Canada V6T 2A3). **34**: No. 1, 172-181(1 Jul 1986).

The two-photon decay widths of nonstandard Higgs bosons are studied in a minimal broken-supersymmetry model. For two-Higgs-doublet models in general, a large enhancement of these widths relative to the standard model is possible. However, we find for the case studied that a severe upper bound on this possible enhancement is imposed by the supersymmetry features of the model. With only the t-italic quark as the heaviest fermion we find a two-photon width of 100 keV for a 160-GeV/c-italic^2 scalar Higgs boson is possible. The corresponding width for a pseudoscalar is 60 keV.

49175 Effect of self-consistent treatment of one-gluon exchange in the Freidberg-Leenor-topological soliton model. Haider, Q.; Liu, L.C. (Los Alamos National Lab., NM, USA). *Journal of Physics G: Nuclear Physics;* **12**: No. 3, L75-L81(Mar 1986). Contract W-7405-ENG-36.

The effects of one-gluon exchange on the static properties of ground-state hadrons have been examined in detail within the framework of Friedberg-Lee non-topological soliton model. It is noted that the perturbative approach, employed in many bag models, is inadequate. A self-consistent non-perturbative procedure for calculating one-gluon exchange is proposed.

6454 Field Theory

REFER ALSO TO CITATION(S) 49150, 49152, 49165, 49173, 49417, 49459, 49460

49176 (CEA-CONF—7939) Theoretical derivation of mass spectra in lattice gauge theories. Drouffe, J.M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Mar 1985. 9p. (CONF-850375—23). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750870.

From 20. Recontre de Moriond; Les Arcs, France (10 Mar 1985).

A short review of the theoretical possibilities for determining the particle spectra in lattice gauge theories is done. As an example, the determination of QCD spectrum at strong coupling in a random lattice model which is rotationally invariant, is presented.

49177 (CNRS-CPT—85-P-1795) Relativistic and nonrelativistic classical field theory on five dimensional space-time. Kunzle, H.P.; Duval, C. (Centre National de la Recherche Scientifique, 13 - Marseille (France). Centre de Physique Theorique). Jul 1985. 17p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86750877.

This paper is a sequel to earlier ones in which, on the one hand, classical field theories were described on a curved Newtonian space-time, and on the other hand, the Newtonian gravitation theory was formulated on a fivedimensional space-time with a metric of signature and a covariantly constant vector field. Here we show that Lagrangians for matter fields are easily formulated on this extended space-time from simple invariance arguments and that stress-energy tensors can be derived from them in the usual manner so that four-dimensional space-time expressions are obtained that are consistent in the relativistic as well as in the Newtonian case. In the former the theory is equivalent to General Relativity. When the magnitude of the distinguished vector field vanishes equations for the (covariant) Newtonian limit follow. We demonstrate this here explicity in the case of the Klein-Gordon/Schroedinger and the Dirac field and its covariant nonrelativistic analogue, the Levy-Leblond field. Especially in the latter example the covariant Newtonian theory simplifies dramatically in this fivedimensional form.

49178 (CONF-8409129—, pp 82-90) **Electron scattering in the presence of laser radiation.** Rosenberg, L. (New York Univ., NY). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

This paper focuses on the problem of electron scattering in a radiation field and describes in detail what is needed to provide a proper theoretical framework for such problems.

49179 (DOE/ER/03992—554) Renormalization group analyses of an SU(2) lattice guage theory. Eubank, S.; Chiu, C. (Texas Univ., Austin (USA). Center for Particle Theory). May 1984. Contract AS05-76ER03992. 34p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014632.

Using Migdal's recursion relation for renormalization group calculations, we describe an approximation for the average value of a Wilson loop and calculate ka^2 vs $1/g^2$ for SU(2) actions of the form $s/sub p/ = -2(\beta/sub f/ \cos \theta/2 + \beta,'sub a/ \cos \theta)$. We use loops as large as 40 x 40 on a 4-dimensional lattice. We also find evidence for a phase transition in the region $\beta/sub a/ \sim -2$, $\beta/sub f/ > 0.7$ using Tan and Xu's modification of the recursion relation. 14 refs., 7 figs.

49180 (DOE/ER/03992—561) Tree unitarity constraints on supersymmetric theories. Dicus, D.A.; Nandi, S. (Texas Univ., Austin (USA). Center for Particle Theory). Jul 1984. Contract AS05-76ER03992. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014626.

The constraints of tree unitarity are applied to a general broken supersymmetric theory. These constraints give relations among the coupling constants for the coupling of the supersymmetric fermions to the W and Z bosons and relations between these couplings and the fermion masses. We also get bounds involving the coupling constants and the masses. For a specific model, where coupling constants are known, these can be used to set upper bounds on the masses of the supersymmetric particles. These bounds and the relations must be satisfied in any model where supersymmetry is broken at the tree level.

49181 (DOE/ER/03992—578) Renormalization of the axial vector current in QCD. Chiu, C.B.; Pasupathy, J.; Wilson, S.L. (Texas Univ., Austin (USA). Center for Particle Theory; Indian Inst. of Science, Bangalore. Centre for Theoretical Studies). Feb 1985. Contract AS05-76ER03992. 34p. (CPT—85-002). NTIS, PC A03/MF A01; GPO Dep. File Number DE86014621.

Following the method of Ioffe and Smilga, the propagation of the baryon current in an external constant axial-vector-field is considered. The close similarity of the operator-product-expansion with and without an external field is shown to arise from the chiral invariance of gauge interactions in perturbation theory. Several sum rules corresponding to various invariants both for the nucleon and the hyperons are derived. The analysis of the sum rules is carried out by two independent methods, one called the ratio method and the other called the continuum method, paying special attention to the nondiagonal transitions induced by the external field between the ground state and excited states. Up to operators of dimension six, two new external-field-induced vacuum expectation values enter the calculations. Previous work determining these expectation values from PCAC are utilized. Our determination from the sum rules of the nucleon axial-vector renormalization constant $G/sub A/$, as well as the Cabibbo coupling constants in the SU_3 symmetric limit ($m/sub s/ = 0$), is in reasonable accord with the experimental values. Uncertainties in the analysis are pointed out. The case of broken flavor SU_3 symmetry is also considered. While in the ratio method, the results are stable for variation of the fiducial interval of the Borel mass parameter over which the left-hand-side and the right-hand-side of the sum rules are matched, in the continuum method the results are less stable. Another set of sum rules determines the value of the linear combination $7F - 5D$ to be $\simeq 0$, or $D/(F + D) \simeq 7/12$. 17 refs., 16 figs.

49182 (DOE/ER/40048—28-N6) Non-topological soliton bag model. Wilets, L. (Washington Univ., Seattle (USA). Dept. of Physics). 1986. Contract AC06-81ER40048. 34p. (CONF-8606183—3). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014283.

From NATO international advanced course on physics of strong fields; Maratea, Italy (1 Jun 1986).

The Friedberg-Lee soliton model, which effects confinement by a quantal scalar field, is discussed. The Lagrangian for the non-topological soliton model is the usual QCD Lagrangian supplemented by a non-linear scalar sigma field term. Static solutions to the field equations are considered in the mean field approximation. Small amplitude oscillations are discussed. Quantum alternatives to the mean field approximation are also considered. Methods of momentum projection and Lorentz boost are described, and the generator coordinate method is discussed. Calculations of the N-N interaction are reviewed briefly. Also discussed is one-gluon exchange, as well as the pion and dressing of the baryons. The hadron states are summarized. One loop quantum corrections are discussed briefly. Work in progress is mentioned in the areas of N-anti N annihilation, the many bag problem, and a Pauli equation for the nucleon. 31 refs. (LEW)

49183 (DOE/ER/40048—29-N6) New force in nature. Fischbach, E.; Sudarsky, D.; Szafer, A.; Talmadge, C.; Aronson, S.H. (Washington Univ., Seattle (USA). Dept. of Physics; Purdue Univ., Lafayette, IN (USA). Dept. of Physics; Brookhaven National Lab., Upton, NY (USA). Physics Dept.; European Organization for Nuclear Research, Geneva (Switzerland)). 1986. Contract AC06-81ER40048. 17p. (CONF-860575—32). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014284.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

We review recent experimental and theoretical work dealing with the proposed fifth force. Further analysis of the original Eotvos experiments has uncovered no challenges to our original assertion that these data evidence a correlation characteristic of the presence of a new coupling to baryon number or hypercharge. Various models suggest that the proposed fifth force could be accommodated naturally into the existing theoretical framework. 40 refs.

49184 (DOE/ER/40108—5) Unusual initial and final state effects in quantum chromodynamics. Final report, July 15, 1983-July 14, 1986. Nelson, C.A. (State Univ. of New York, Binghamton (USA). Dept. of Physics). Jul 1986. Contract AC02-83ER40108. 11p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014707.

This work was in the area of theoretical high energy and nuclear physics. To avoid the non-cancellation of infrared divergences in hadron-hadron scattering, it was proposed that the partons be identified with nearly degenerate, coherent quark-gluon "jet" states. For deep-inelastic lepton-hadron scattering, explicit calculation using the operator product expansion showed that the usual non-singlet coefficient function follows despite different O(α/sub s/) finite parts in F_2/sup NS/ and A/sub n//sup NS/. It was also shown that a "jet" based factorization occurs at higher twist, through the general order α/sub s/(α/sub s/ log ω)/sup n/ where the soft cutoff ω characterizes the quark jet, when initial quark jets are used to avoid the non-cancelling infrared divergences. The phi phi symmetry tests for P/CP determination and for discrete symmetry violations were generalized to the generic sequential decay $X \rightarrow V_1V_2$ for X of any spin, with each $V \rightarrow 2$ or 3 spin-0 bosons, anti ll, or anti qq. The correlation between the decay planes in Higgs boson decays into a W pair (or a Z pair), for example, provides a test of the Higgs bosons' CP eigenvalue, and a sensitive probe of the Higgs coupling. 24 refs. (LEW)

49185 (DOE/ER/40233—T1) Topics in gauge theories and unification of elementary particle interactions. Srivastava, Y.N.; Vaughn, M.T. (Northwestern Univ., Chicago, IL (USA)). 4 Apr 1986. Contract FG02-85ER40233. 10p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013957.

The proposed research includes work on (1) jets in minimum bias, (2) quantum Hall effect and applications of quantum electrodynamics to microelectronics and (3) renormalization group analysis of unified gauge theories. In addition, rates were computed for vector boson decay modes of the nucleon in N=1 supergravity models, and is doing further work on supersymmetric signals at SLC and LEP, and on superstring phenomenology.

49186 (DOE/ER/45144—T2) [Research in the theory of condensed matter and elementary particles.] Progress report. (Chicago Univ., IL (USA)). [1986]. Contract FG02-84ER45144. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013958.

Progress is summarized in these areas: a new formulation of two dimensional critical phenomena and string theory, supersymmetric critical phenomena and string compactification, conformal field theory on orbifolds, Gaussian models with twisted boundary conditions, modular invariance and supersymmetric critical phenomena, critical indices, conformal invariance, and current algebra, renormalization group fixed points and the string equation of motion, fermionic string field theory, N = 2 super Riemann surfaces, the spinor field in covariant superstring theory, covariant quantization of superstrings, models of aggregation, and quasi-supersymmetry in the BCS mechanism. Further work is proposed in the areas of two dimensional critical phenomena, two dimensional conformal field theory and string theory, the physics of computation, models of aggregation, and the many vortex Aharonov-Bohm problem. 57 refs. (LEW)

49187 (INS—530) N=1 supergravity on the light-cone superspace. Hori, Takayuki. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Mar 1985. 28p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703107.

The action of N=1 supergravity in the light-cone gauge is explicitly expressed in terms of an unconstrained light-cone superfield which contains the physical components of fields only. The superspace action is manifestly invariant under the kinematical supertransformations which consist of a part of the gauge preserving transformations. Our procedure is based entirely on the component formalism and the generalization to extended supergravities is straightforward.

49188 (LA-UR—86-2386) Constraints on general SU(2)/sub L/ x SU(2)/sub R/ x U(1) electroweak models from nuclear beta decay. Herczeg, P. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 7p. (CONF-860741—11). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013844.

From International symposium on weak and electromagnetic interactions in nuclei; Heidelberg, F.R. Germany (1 Jul 1986).

The implications of beta-decay experiments for more general versions of SU(2)/sub L/ x SU(2)/sub R/ x U(1) models are analyzed, including the most general one which allows for CP-violation, unequal left- and right-handed quark mixing angles, and mixing in the leptonic sector. For each scenario, the constraints on the pertinent parameters from beta-decay measurements are compared with the constraints provided on them by other data.

49189 (NBI-HE—84-44) Supersymmetric extension of the chiral model and the Wess-Zumino term in two dimensions. Abdalla, E.; Abdalla, M.C.B. (Niels Bohr Inst., Copenhagen (Denmark)). 1984. 4p. Also published in Phys. Lett., B (28 February 1985) v. 152(1/2) p. 59-62.

We formulate the supersymmetric version of the chiral model summed to the Wess-Zumino term. The β-function of this model has a non-trivial zero, where the fermion decouples.

49190 (NIKHEF-H—85-12) On the quantization of non-compact field theories in Minkowski space. Holten, J.W. van. (Nationaal Inst. voor Kernfysica en Hoge-Energiefysica (NIKHEF), Amsterdam (Netherlands). Sectie H). Oct 1985. 13p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703108.

The definition and regularization of Minkowski-space path integrals for field theories with non-compact field manifolds is examined. It is shown that a quantization procedure including constrained auxiliary field components in a positive definite Hilbert space necessarily requires non-standard analytic continuation of Green's functions for these constrained fields. 12 refs.; 3 figs.

49191 (RRK—85-4) Supergravity theories. Uehara, S. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Feb 1985. 23p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703140.

A review on the recent status of the supergravity theories is presented.

49192 (RRK—85-6) Phase structure of the SU(3) gauge-Higgs system, 2. Adjoint Higgs. Kikugawa, Masayoshi; Maehara, Toshinobu; Saito, Juichi; Tanaka, Hidekazu; Yamaoka, Yoshihiro; Sasaki, Ryu. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics; Hiroshima Univ. (Japan). Dept. of Physics). Feb 1985. 39p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703109.

The phase structure of the SU(3) adjoint Higgs model is studied by a Monte Carlo simulation. We report the results of the simulation carried out on a four-dimensional euclidean lattice of size 3^4 and $6^3 \times 3$. We find clear signals of the transition from a symmetric phase to broken ones. At finite temperature, the broken Higgs phase consists of three parts i.e., the SU(2) x U(1)-confined phase, the U(1)-Coulomb and SU(2)-confined normal Higgs phase, and the finite temperature Higgs phase with SU(2) x U(1) Coulomb interactions. We conjecture that the last one will disappear at zero temperature. The symmetric phase is divided into two by a deconfining transition. The deconfined symmetric phase will disappear at zero temperature.

49193 (RRK—85-7) Higher derivative regularization and chiral anomaly. Nagahama, Yoshinori. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Feb 1985. 13p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703110.

A higher derivative regularization which automatically leads to the consistent chiral anomaly is analyzed in detail. It explicitly breaks all the local gauge symmetry but preserves global chiral symmetry and leads to the chirally symmetric consistent anomaly. This regularization thus clarifies the physics content contained in the consistent anomaly. We also briefly comment on the application of this higher derivative regularization to massless QED.

49194 Four-dimensional boson field theory. II. Existence. Baker G.A. Jr. (Theoretical Division, Los Alamos National Laboratory, University of California, Los Alamos, New Mexico 87545). *Journal of Mathematical Physics (New York);* **27**: No. 9, 2379-2393(Sep 1986). Contract W-7405-ENG-36.

The existence of the continuum, quantum field theory found by Baker and Johnson [G. A. Baker, Jr. and J. D. Johnson, J. Phys. A 18, L261 (1985)] to be nontrivial is proved rigorously. It is proved to satisfy all usual requirements of such a field theory, except rotational invariance. Currently known information is consistent with rotational invariance however. Most of the usual properties of other known Euclidean boson quantum field theories hold here, in a somewhat weakened form. Summability of the sufficiently strongly ultraviolet cutoff bare coupling constant perturbation series is proved as well as a nonzero radius of convergence for high-temperature expansions of the corresponding continuous-spin Ising model. The description of the theory by these two series methods is shown to be equivalent. The field theory is probably not asymptotically free.

49195 Spectra of supersymmetric O(N-italic) sigma models in 0+1 dimension. Sathiapalan, B. (Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania 19104). *Journal of Mathematical Physics (New York);* **27**: No. 9, 2429-2433(Sep 1986).

The spectra of the supersymmetric O(N-italic) nonlinear sigma models in 0+1 space-time dimension are computed exactly for any N-italic, using group theoretical methods. The allowed representations are O(N-italic) analogs of the Wigner d-italic functions.

49196 Purely cubic action for string field theory. Horowitz, G.T.; Lykken, J.; Rohm, R.; Strominger, A. (Department of Physics, University of California, Santa Barbara, California 93106). **57**: No. 3, 283-286(21 Jul 1986).

We show that Witten's open—bosonic-string field-theory action and a closed-string analog can be written as a purely cubic interaction term. The conventioanl form of the action arises by expansion around particular solutions of the classical equations of motion. The explicit background dependence of the conventional action via the Becchi-Ronet-Stora-Tyutin operator is eliminated in the cubic formulation. A closed-form expression is found for the full nonlinear gauge transformation law.

49197 Wess-Zumino action from the Grammer-Yennie approximation. Tucci, R. (High Energy Physics Division, Argonne National Laboratory, Argonne, Illinois 60439). **34**: No. 2, 571-584(15 Jul 1986). Contract W-31-109-ENG-38.

We study a path integral which represents a jet of collinear particles under a soft axial background in four space-time dimensions. The background is treated using a background-field gauge. We perform special infinitesimal changes of variable on the path integral. Our changes of variable correspond to infinitesimal translations of the jet with respect to the soft background. We show that the vector gauge-invariant Wess-Zumino action arises in this situation.

49198 Induced quantum numbers in (2+1)-dimensional QED. Blankenbecler, R.; Boyanovsky, D. (Stanford Linear Accelerator Center, Stanford University, Stanford, California 94305). **34**: No. 2, 612-618(15 Jul 1986). Contract AC03-76SF00515.

In this paper the vacuum-polarization effects of fermions interacting with Abelian gauge fields are studied in 2+1 dimensions. We find that for a gauge-field configuration with magnetic flux 2πF, there is an induced charge Q, spin S, and angular momentum J given by Q = -1/2(m/absolute value of m)F, S = F-italic/4, J = -(1/4)(m/absolute value of m)F^2 (m = fermion mass). A simple argument is offered to explain the physics of these quantum numbers. Some subtleties associated with the induced spin and angular momentum are explained in detail. The induced spin is shown to be related to the (1+1)-dimensional chiral anomaly.

49199 Superweak C-italicP-italic nonconservation arising from an underlying quarternionic quantum dynamics. Adler, S.L. (The Institute for Advanced Study, Princeton, New Jersey 08540). **57**: No. 2, 167-169(14 Jul 1986).

We show that the hypothesis of an underlying quaternionic dynamics for particle physics naturally implies an effective complex C-italicP-italic-nonconserving interaction of s-italicu-italicp-italice-italicr-italicw-italice-italica-italick-italic f-italico-italicr-italicm-italic, but arising in s-italice-italicc-italico-italicn-italicd-italic o-italicr-italicd-italice-italicr-italic in the quarternionic perturbation. The energy scale for the appearance of strong quaternionic effects is estimated to be 20 TeV.

49200 Feeble intermediate-range forces from higher dimensions. Bars, I.; Visser, M. (Physics Department, University of Southern California, Los Angeles, California 90089-0484). **57**: No. 1, 25-28(7 Jul 1986).

We develop a scenario in which feeble intermediate-range forces emerge as an effect resulting from the compactification (a-italic-grave-accent l-italica-italic Kaluza-Klein) of a five-dimensional model. It is conjectured that this general strategy will prove applicable to more realistic multidimensional theories such as the ten-dimensional superstring. We speculate that deviations from the standard gravitational force: similar to the ones reported recently as a "fifth force": may be interpreted as evidence for higher dimensions.

49201 Quark vacuum polarization and the Luescher term. Olsson, M.G.; Suchyta C.J. III. (Physics Department, University of Wisconsin, Madison, Wisconsin 53706). **57**: No. 1, 37-39(7 Jul 1986).

The Luescher term found in the QCD string model and in Monte Carlo lattice gauge calculations is significantly modified by vacuum polarization due to light-quark loops. This modification improves agreement with experiment.

49202 Numerical determination of the QCD β function. Gavai, R.V.; Karsch, F. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). **57**: No. 1, 40-43(7 Jul 1986). Contract AC02-76CH00016.

The β function of SU(3) lattice gauge theory with three flavors of light dynamical quarks is obtained numerically by use of the (improved) ratio method. It appears to have a dip structure similar to that found in the theory without quarks. Our data seem to suggest that deviations from asymptotic scaling may be small for βapprox. >5.3.

49203 Monte Carlo calculation of the spin-dependent potentials for heavy-quark spectroscopy. Campostrini, M.; Moriarty, K.; Rebbi, C. (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy and Brookhaven National Laboratory, Upton, New York 11973). **57**: No. 1, 44-47(7 Jul 1986). Contract AC02-76CH00016.

We calculate by lattice numerical methods the spin-dependent potentials relevant for heavy-quark spectroscopy. We find a long-range nonperturbative component in one of the spin-orbit potentials, whereas all other potentials exhibit a short-ranged perturbative behavior.

49204 Large-n-italic behavior of the deep-inelastic structure functions and the renormalization- and factorization-scheme dependences. Nakkagawa, H.; Nie-acute-accentgawa, A.; Yokota, H. (Institute for Natural Science, Nara University, 1230 Horai-cho, Nara 631, Japan). **34**: No. 1, 244-253(1 Jul 1986).

The problem of singular perturbation coefficients for n-italic→ that appear in the second-order QCD calculation of the moment of the deep-inelastic structure function F-italic$_2$/sup n-italic/ is investigated by applying the optimized perturbation theory (OPT). Special emphasis is paid to the connection with the kinematical analysis based on the resummation of singular terms. The main results of the present paper are as follows. (i) The simultaneous application of the generalized two-scale OPT to the factorization- and renormalization-scheme dependences of F-italic$_2$/sup n-italic/ not only absorbs the most singular $\ln^2 n$ terms in the perturbation coefficients into the effective mass scale with which the coupling constant runs, but also sweeps up the less singular lnn-italic terms to end up with a suppressing "form factor." (ii) Applying the single-scale OPT to the renormalization-scheme dependence of the Q-italic^2 dependence of the structure function R-italic$_2$/sup n-italic/—d lnF-italic$_2$/sup n-italic//d lnQ-italic, all the singular terms are completely absorbed into the effective mass scale, leaving the non-singular perturbation coefficients. The R-italic$_2$/sup n-italic/ thus optimized and the R-italic$_2$/sup n-italic/ obtained from the F-italic$_2$/sup n-italic/ optimized as in (i) are shown to agree remarkably well more than expected formally and also to agree numerically very well. (iii) Results (i) and (ii) agree up to the most singular terms with those obtained through the kinematical analyses of Brodsky and Lepage and of Amati e-italict-italic a-italicl-italic.

49205 Comparison of an exact fermion Monte Carlo algorithm with the pseudofermion method using staggered fermions. Gavai, R.V.; Gocksch, A. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). **56**: No. 25, 2659-2663(23 Jun 1986). Contract AC02-76CH00016;AS03-81ER40029.

We present first results obtained from a simulation of lattice QCD with staggered fermions by a Monte Carlo algorithm that incorporates the effect of the fermion determinant exactly. The chiral condensate chi-barchi and various Wilson-loop expectation values are measured on a 4^4 space-time lattice and the results are compared with the same quantities measured on the same-size lattice with the pseudofermion method. A quantitatively good agreement is found.

49206 On the fermion mass and lattice size dependence of SU(2) gauge theory thermodynamics. Kogut, J.B.; Polonyi, J.; Wyld, H.W.; Shigemitsu, J.; Sinclair, D.K. (Illinois Univ., Urbana, USA. Dept. of Physics; Ohio State Univ., Columbus, USA. Dept. of Physics; Argonne National Lab., IL, USA). **270**: No. 2, 155-168(16 Jun 1986). Contract W-31-109-ENG-38;AC02-76ER01545.

SU(2) lattice gauge theory with four Dirac fermions is studied on lattices of 2×6^3 and 4×8^3 for bare fermion masses m ranging from 1.0 to 0.10 in lattice units. The results are compared with effective field theory descriptions of the finite temperature deconfining transition. As m decreases the effective theory fails to describe the abruptness of the crossover from the hadronic to plasma phase on the 4×8^3 lattice. The 2×6^3 data are compared to the 4×8^3 data and are found to be artifically smooth and misleading. Large lattices are essential in the studies of the thermodynamics of gauge theories with fermion feedback.

49207 Equivalence of the light-cone formulation and the gauge-invariant formulation of string dynamics. Peskin, M.E.; Thorn, C.B. (Stanford Linear Accelerator Center, CA, USA; Florida Univ., Gainesville, USA. Dept. of Physics). **269**: No. 3/4, 509-529(9 Jun 1986). Contract AC03-76SF00515;AS05-81ER40008.

We show how to fix the newly discovered gauge-invariant string field theory to the light-cone gauge. We prove that this procedure leads to the well-known light-cone formulation of string field theory, with no additional propagating degrees of freedom.

49208 Testing two versions of lattice gauge theory: Creutz ratios in U-italic(1)$_3$. Cahill, K.; Reeder, R. (Department of Physics and Astronomy, University of New Mexico, Albuquerque, New Mexico 87131). **43**: No. 3, 1043-1060(Jun 1986).

In our simplicial version of lattice gauge theory, we approximate Euclidean path integrals by tiling space-time with simplexes and by linearly interpolating the fields throughout each simplex from their values at the vertices. We compare this method with Wilson's lattice gauge theory for U-italic(1) in three dimensions. As a standard of comparison, we compute the exact values of Creutz ratios of Wilson loops in the continuum theory. Monte Carlo computations using the simplicial method give Creutz ratios within a few percent of the exact values for reasonably sized loop at $\beta = 1$, 2, and 10. Similar computations using Wilson's method give ratios that typically differ from the exact values by factors of 2 or more for $1<$ or $=\beta<$ or $=3.5$ and that have the wrong β dependence. The better accuracy of the simplicial method is due to its use of the action and domain of integration of the exact theory, unaltered apart from the granularity of the simplicial lattice. We also present data on the action density and the mass gap.

49209 Lattice gauge theory with a fast highly parallel computer. Chist, N.H. (Department of Physics, Columbia University, New York, New York 10027). **43**: No. 3, 1061-1072(Jun 1986).

Results for the temperature of the color deconfinement phase transition in pure S-italicU-italic(3) lattice gauge theory are described. These were obtained on a specially built 16-node, 256 Megaflop computer using the Metropolis algorithm. The architecture, performance, and expansion plans for this machine are also discussed.

49210 β function, scaling, and improved action for S-italicU-italic(3) lattice gauge theory. Gupta, R.; Guralnik, G.; Patel, A. (Theory Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). **43**: No. 3, 1101-1104(Jun 1986).

We present a detailed analysis of the nonperturbative β function along the Wilson axis for the S-italicU-italic(3) pure gauge theory using the Monte Carlo renormalization group method. The scaling behavior of the string tension, the deconfinement transition temperature, and the O^{++} glueball mass obtained from published data is compared. The results show that there is no asymptotic scaling for K-italic/sub F-italic/equivalent$(6/g\text{-italic}^2)<6.1$. We also estimate the renormalized action generated by the $\sqrt{3}$ block transformation for use in future calculations.

49211 Deconfining phase transition in lattice quantum chromodynamics. Gottlieb, S.A.; Kuti, J.; Toussaint, D.; Kennedy, A.D.; Meyer, S.; Pendleton, B.J.; Sugar, R.L. (Department of Physics, University of California at San Diego, La Jolla, California 92093). **43**: No. 3, 1105-1116(Jun 1986).

We present a large-scale Monte Carlo calculation of the deconfining phase transition temperature in lattice quantum chromodynamics without fermions. Using the Wilson action, the transition

temperature as a function of the lattice coupling g-italic is consistent with scaling behavior dictated by the perturbative β function for 6/g-italic^2>6.15.

49212 Large-scale calculations for hadron spectroscopy. Rebbi, C. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). **43**: No. 3, 1117-1128(Jun 1986). Contract AC02-76CH00016.

Some recent Monte Carlo calculations for quantum chromodynamics, performed on Euclidean lattices of rather large extent, are reviewed. The purpose of the calculations is to provide accurate determinations of quantities, such as interquark potentials or mass eigenvalues, which are relevant for hadronic spectroscopy. Results obtained in quenched QCD on $16^3 \times 32$ lattices are illustrated, and a discussion of computational resources and techniques required for the calculations is presented.

49213 Lattice QCD: Going beyond the mass spectrum. Sharpe, S.R. (Physics Department, FM-15, University of Washington, Seattle, Washington 98195). **43**: No. 3, 1129-1146(Jun 1986).

The present status of lattice measurements with fermions is discussed. Methods are presented which improve the extraction of particle masses using staggered fermions. It is suggested that fermion physics on blocked lattices might show improvement as compared to that on lattices generated with the Wilson action. This idea is tested by comparing results from $18^3 \times 42$ lattices generated at $\beta = 6.2$ with results from the $6^3 \times 14$ lattices obtained from them by twice blocking with a 3/sup 1/2/ transformation. Also, a comparison of $8^3 \times 16$ blocked and Wilson axis lattices is made. Finally, three point correlators are used to elucidate the properties of the scalar isoscalar channel.

49214 Monte Carlo studies with the ST-100 array processor. Sugar, R.L. (Department of Physics, University of California, Santa Barbara, California 93106). **43**: No. 3, 1147-1170(Jun 1986).

Monte Carlo simulations with the 100 Mflop ST-100 array processor are described. The architecture of the array processor and its applicability to large-scale numerical simulations is discussed. Results are presented for the Abelian Higgs model, a charge density wave transition in a quasi-one-dimensionl system and the finite temperature phase transition in S-italicU-italic(3) lattice gauge theory.

49215 Molecular dynamics algorithm for simulation of field theories in the canonical ensemble. Kogut, J.B.; Sinclair, D.K. (Illinois Univ., Urbana, USA. Dept. of Physics; Argonne National Lab., IL, USA. High Energy Physics Div.). **270**: No. 1, 39-49(26 May 1986).

We add a single scalar degree of freedom ("demon") to the microcanonical ensemble which converts its molecular dynamics into a simulation method for the canonical ensemble (euclidean path integral) of the underlying field theory. This generalization of the microcanonical molecular dynamics algorithm simulates the field theory at fixed coupling with a completely deterministic procedure. We discuss the finite size effects of the method, the equipartition theorem and ergodicity. The method is applied to the planar model in two dimensions and SU(3) lattice gauge theory with four species of light, dynamical quarks in four dimensions. The method is much less sensitive to its discrete time step than conventional Langevin equation simulations of the canonical ensemble. The method is a straightforward generalization of a procedure introduced by S. Nose for molecular physics.

49216 Parity anomalies in gauge theories in 2+1 dimensions. Rao, S.; Yahalom, R. (Stanford Linear Accelerator Center, CA, USA; Fermi National Accelerator Lab., Batavia, IL, USA; California Inst. of Tech., Pasadena, USA). **172**: No. 2, 227-230(15 May 1986). Contract AC03-76SF00515.

It is shown that the introduction of massless fermions in an abelian gauge theory in 2+1 dimensions does not lead to any parity anomaly despite a non-commutativity of limits in the structure function of the odd part of the vacuum polarisation tensor. However, a parity anomaly does exist in non-abelian theories due to a conflict between gauge invariance under large gauge transformations and the parity symmetry.

65 PHYSICS II

6510 Nuclear Physics

REFER ALSO TO CITATION(S) 48337, 48338, 48343, 49129, 49559, 49560, 49562, 49616

49217 (BNL—38297) Summary of hypernuclear sessions. Chrien, R.E. (Brookhaven National Lab., Upton, NY (USA). Physics Dept.). 1986. Contract AC02-76CH00016. 10p. (CONF-860575—28). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014123.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

Fifteen papers on hypernuclear physics are briefly summarized. Topics covered include the physics of deuterium and its strangeness analogues, a candidate for an S = -1 dibaryon resonance, bag model predictions for dibaryons, planned dibaryon searches, narrow Sigma states, calculations of quasi-free Sigma production, weak decay of Lambda hypernuclei, a cloudy quark-bag model calculation of the kaon-nucleon interaction, the Bonn potential applied to the Lambda-nucleon system, calculations of kaon photoproduction, and a proposed search for an eta-mesic bound nuclear system. (LEW)

49218 (BNL—38298) Review of high energy hadron-nucleus data. Lissauer, D. (Brookhaven National Lab., Upton, NY (USA). Physics Dept.; Tel Aviv Univ. (Israel). Dept. of Physics). 1986. Contract AC02-76CH00016. 21p. (CONF-860441—6). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014185.

From 5. international conference on ultra-relativistic nucleus-nucleus collisions (Quark Matter '86); Pacific Grove, CA, USA (13 Apr 1986).

New data on hadron-nucleus interactions are summarized, focusing on: estimation of the rate of energy loss of the incident hadron as it propagates through the target, and determining where the energy is deposited in central hadron-nucleus collisions. The present status of pA $\rightarrow$ p + X inclusive measurements is discussed. Measurements from visual detectors which allow investigation of global event properties are presented. Data taken from calorimeters, where one can trigger and measure transverse energy and energy flow over a given rapidity region, are discussed. 22 refs., 20 figs. (LEW)

49219 (DOE/ER/40048—26-N6) Fundamental interaction studies in nuclei. Haxton, W.C. (Washington Univ., Seattle (USA). Dept. of Physics). 1986. Contract AC06-81ER40048. 12p. (CONF-860575—31). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014282.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

There is a growing class of nuclear and atomic physics experiments in which the special properties of many-body systems are exploited in tests of fundamental symmetries. Three representative topics are discussed: parity nonconservation in the NN interaction, time reversal-odd nuclear moments, and matter-enhanced neutrino oscillations.

49220 (NEANDC(J)—117/U, pp 41-51) Format of JENDL. Nakagawa, T. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

The ENDF/B format is adopted for JENDL. In this paper, the basic aspects of the ENDF/B format are explained and differ-

ences among recent versions of the ENDF/B format are summarized.

49221 (NEANDC(J)—117/U, pp 68-98) **Processing of the nuclear data file and the problems of JENDL.** Hasegawa, A. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

A brief outline of the processing of the nuclear data files is presented. Particular stress is placed on the problems encountered in the processing of the JENDL2, JENDL-3PR1 and PR2 (Japanese Evaluated Nuclear Data File version 2, version 3 preliminary-1 and -2 files). Some recommendations to resolve the problems are also made.

49222 (NEANDC(J)—117/U, pp 99-118) **Double differential neutron emission cross sections at 14 MeV measured at OKTAVIAN.** Takahashi, A. (Osaka Univ., Yamadaoka, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

A review is given for double differential neutron emission cross sections at 14 MeV, measured at OKTAVIAN since 1981. The present status of evaluated nuclear data libraries (ENDF/B-IV and JENDL-3PR1) pertaining to fusion reactors is shown by comparison with the measured data. Results show that insufficient secondary neutron data are given in ENDF/B-IV for D, Li, Be, B C, F, Na, Cl, Ti, Cr, Mn, Ni, Cu, Zr, Nb, Mo, W and Pb, although the data for N, O, Si, Al and Fe are fairly well evaluated. Significant improvements are seen in JENDL-3PR1 & 3PR2.

49223 (NEANDC(J)—120/U) **Proceedings of the 1985 seminar on nuclear data.** Asami, Tetsuo; Mizumoto, Motoharu (eds.). (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Jun 1986. 437p. (JAERI-M—86-080; INDC(JPN)—106/L; CONF-8511220—). JAERI, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan. File Number TI86901587.

From Seminar on nuclear data; Tokai, Japan (12 Nov 1985).

Separate abstracts were prepared for 39 papers presented in this conference. Subjects addressed at the conference included: nuclear data activities at the Institute of Atomic Energy in Beijing, China; at the research center for nuclear techniques in Bandung, Indonesia; and of the Japanese Nuclear Data Committee (JNDC). The main thrust of the conference was nuclear research in Japan including activities of the JNDC working groups, the relation between absolute and relative measurements of nuclear data, nuclear data for fusion reactors, and problems in heavy nuclide nuclear data. A poster session was held in which a large variety of topics was discussed dealing mostly with neutron research. (DWL)

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REFER ALSO TO CITATION(S) 49118

49224 (ANL—85-22, pp 9-11) **Study of the 165-MeV pion absorption mechanism in ^{3}He through the (π^+,2p) and (π^-,pn) reactions.** Ashery, D.; Geesaman, D.F.; Levenson, S.M.; Schiffer, J.P.; Stephans, G.; Ungricht, E.; Zeidman, B.; Anderson, B.D.; Das, G.; Madey, R.; McKeown, R.D. (Tel Aviv Univ., Israel). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

New measurements of the angular dependences of the ^{3}He(π^+,pp) and ^{3}He(π^-,pn) reactions were carried out to provide more quantitative information on the cross section and on the orbital angular momenta involved. The experiment was performed in the P^3 area at LAMPF with 165-MeV pions incident on a liquid ^{3}He target. Preliminary analyses indicate that the angular distribution for π^+ resembles that of the $\pi^+ + d \rightarrow pp$ reaction. The π^- angular distribution is quite similar to the π^+ distribution and is consistent with symmetry about 90°. This is in contrast to the asymmetric π^- angular distribution seen at 65 MeV. Information on the three-body absorption ($\pi^+ + {}^3\text{He} \rightarrow {}^3\text{p}$) has also been obtained. It appears that the integrated cross sections for 3-body absorption is roughly half that of the 2-body mechanism. In a second data run in the fall of 1984, the (π^+,2p) and (π^-,pn) reactions were studied at 250 MeV at proton lab angles of 20°, 40°, 75° and 130°. The 165-MeV data were also extended to the proton angle of 20°. The analysis of the data, which included significant normalization checks on the previous data is currently under way.

49225 (ANL—85-22, pp 11) **Study of the (π,πp) reaction and quasifree scattering in ^{4}He.** Ashery, D.; Geesaman, D.F.; Jackson, H.E.; Schiffer, J.P.; Zeidman, B.; Segel, R.E.; Gram, P.A.M. (Tel Aviv Univ., Israel). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The measurement of inelastic pion scattering observed in coincidence with a recoil proton has been approved for a target of ^{4}He. Angular distributions will be obtained for π^+ energies of 160, 220, and 350 MeV. Emergent pions will be detected in the LAS spectrometer while an array of scintillation counters that span a large solid angle will be used to detect protons.

49226 (ANL—85-22, pp 18) **Tensor polarization in pion-deuteron elastic scattering.** Holt, R.J.; Freeman, W.S.; Geesaman, D.F.; Specht, J.R.; Ungricht, E.; Zeidman, B.; Stephenson, E.J.; Moses, J.D.; Farkhondeh, M.; Gilad, S.; Redwine, R.P. (Fermi National Accelerator Lab., Batavia, IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

During this year the analysis of measurements of t_{20} in π-d elastic scattering was completed and a final summary manuscript was prepared for publication. The results consists of angular distributions of the deuteron tensor polarization in π-d elastic scattering at pion energies of 140, 180, 220 and 256 MeV. Theoretical calculations in which the effects of pion absorption on the elastic channel are small reproduce the data. No rapid angular or energy dependence was found near a pion energy of 134 MeV, where another experiment at SIN has suggested the existence of dibaryon resonances.

49227 (ANL—85-22, pp 43) **Search for a light-scalar boson emitted in nuclear decay.** Napolitano, J.; Freedman, S.J.; Nelson, J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Using the Physics Division Dynamitron to produce ^{4}He (0$^+$, 20 MeV) via radiative capture of protons on a tritium target, the authors performed a sensitive search for Higgs-like scalar particles with masses roughly between 3 and 14 MeV. This work has been published. In this paper the authors point out that even though this work is more than 2 orders of magnitude more sensitive than the only previous experiment, uncertainties in the theoretical interpretation strongly suggest that a significantly more sensitive experiment be performed to lay the issue to rest.

49228 (ANL—85-22, pp 122-124) **Faddeev-Monte Carlo studies of three-body forces in the triton.** Wiringa, R.B.; Friar, J.L.; Gibson, B.F.; Payne, G.L.; Chen, C.R. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Conventional five-channel Faddeev wave functions for the triton have been used as input to a Monte Carlo integration routine to study the effect of three-body potentials on the triton binding energy. Momentum-space Faddeev calculations including the

Tucson-Melbourne three-body potential were carried out by the Purdue and Bochum groups in 1983 that suggested that there was little effect on the binding energy of the triton. This was in disagreement with variational Monte Carlo studies of Carlson, Pandharipande and Wiringa (CPW) done at Argonne and Urbana, which indicated a significant additional binding ~1 MeV. To investigate this discrepancy, the authors used configuration-space Faddeev wave functions obtained for three realistic NN potentials [Reid soft core, Argonne v_{14} and Super-soft core (C)] and computed Monte Carlo expectation values of three different three-body potentials (Tuscon-Melbourne, Brazil, and Urbana model V). The results are presented.

49229 (ANL—85-22, pp 124-125) **Variational Monte Carlo calculations of few-body nuclei.** Wiringa, R.B.; Schiavilla, R.; Pandharipande, V.R. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Preliminary results have been obtained for the proton momentum distribution, N/sub dp/(k), the d + p breakup momentum distribution, N/sub dp/(k), and the d + p cluster amplitudes in ^{3}He, using the Reid NN potential, and the Urbana and Argonne NN potentials with the Urbana three-body potential. The calculated quantities agree reasonably well with recent (e,e'p) data from Saclay, when the three-body potential is included in the Hamiltonian. The calculations for ^{3}He have also been performed using 5-channel Faddeev wave functions provided by the Los Alamos-Iowa group. The results are similar, but the Faddeev wave functions give more binding than the variational ansatz the authors have been using, and also have a better value for the distorted wave parameter D_S. The authors are currently trying to analyze the Faddeev wave function in hopes of making improvements to the variational ansatz, which could then be used in ^{4}He and larger systems as well as in ^{3}He.

49230 (ANL—85-22, pp 125) **Relativistic effects in three-body nuclei.** Coester, F.; Glockle, W.; Lee, T.S.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

It is well known that realistic two-body forces alone cannot account quantitatively for the observed binding energy of the triton. The authors have investigated simple three-body models amenable to exact numerical solution of both the relativistic and the nonrelativistic Faddeev equations. In these models the authors found again a high order cancellation of positive and negative contributions to the relativistic corrections of the binding energy. The overall relativistic effect is a net decrease in binding. The authors have also calculated momentum distributions for the models and find increases >10% for momenta $p>3fm^{-1}$.

49231 (ANL—85-22, pp 131-132) **Electromagnetic form factors of the deuteron.** Chung, P.L.; Coester, F.; Polyzou, W.N. (Univ. of Iowa, Iowa City). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Measurements of the deuteron form factors over a wide range of momentum transfer can provide important clues to the role of subnucleon degrees of freedom in nuclear dynamics. The authors are calculating the contributions of one-body operators to the deuteron form factors for arbitrary momentum transfer in a consistent unambiguous fashion. The results are needed for the next step which will be to examine the interaction terms in the charge current density required by the data and to interpret them in terms of subnucleon degrees of freedom.

49232 **(BNL—38336) Future dibaryon research at BNL.** Pile, P.H. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 8p. (CONF-860575—30). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014182.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

An experiment designed to search for a strangeness -1 dibaryon is discussed. The experiment will use the ^{3}He(K$^-$, π^+)nD/sub π/ reaction and is expected to begin near the end of the year at the BNL AGS using the existing LESB-I beamline and hypernuclear spectrometer system. Planned searches for a strangeness -2 dibaryon are also discussed. The strangeness -2 dibaryon searches will however require the construction of a new 1.8 GeV/c kaon beam line at the AGS.

49233 **(INS—532) Tensor analyzing power in backward pd elastic scattering and its connection to pp → πd at intermediate energies.** Nakamura, A.; Satta, L. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Mar 1985. 18p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703146.

The tensor analyzing power for pd backward elastic scattering is calculated in the energy range 150 <= Tsub(p) <= 800 MeV. Two main contributions are considered: the one nucleon exchange and the so called triangle graph, including pp → πd as a subprocess. The pd backward elastic cross section and tensor analyzing power are fairly well reproduced by the model.

49234 **(LA-UR—86-2139) Three-body force in the three-nucleon system.** Gibson, B.F. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 16p. (CONF-8604194—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012399.

From International symposium on three-body force in the three-nucleon system; Washington, DC, USA (24 Apr 1986).

A brief summary of the symposium is presented. Three-nucleon force models are discussed, including the two-pion exchange potential, NN-ΔN coupled-channels model, and phenomenological parametrization. Relevant experimental data and model calculations are discussed including form factors, binding energies, charge radii, and charge density for ^{3}H and ^{3}He. A calculation of the EMC effect for ^{3}He is also made using Sasakawa's wave function and compared to experimental data obtained at SLAC. The paper ends with discussions of proton-deuteron scattering, investigations at intermediate energies, and QCD efforts to understand the three-body problem. (DWL)

49235 **(UCRL—94764) Exploratory gas-target experiment at PEP using the TPC/2 γ facility.** Dietrich, F.S.; Melnikoff, S.O.; Van Bibber, K.A. (Lawrence Livermore National Lab., CA (USA)). Jun 1986. Contract W-7405-ENG-48. 4p. (CONF-860575—14). NTIS, PC A02/MF A01; GPO Dep. File Number DE86012806.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

A pilot nuclear-physics experiment at the PEP ring was performed by bleeding deuterium, argon, and xenon gases into the interaction region containing the TPC/2Y facility. The purpose of the experiment was to obtain information for the design of a dedicated nuclear-physics interaction region at PEP, as well as to obtain a first view of the physics that could be studied at such a facility. 1 ref., 4 figs.

49236 **(WUD—84-15) Determination of the magnetic form factor of the deuteron at a momnetum transfer of $q^2\hbar 0.5$ (GeV/c)^2.** Remenschnitter, B. (Wuppertal Univ. (Gesamthochschule) (Germany, F.R.). Fachbereich 8 - Naturwissenschaften 1 - Physik). Jul 1984. 67p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752580.

In the framework of this thesis a coincidence apparature at the Bonn 2.5 GeV synchrotron was tested by elastic electron-deuteron scattering at a momentum transfer of $q^2=0.5$ (GeV/c)^2. These data taken up there were evaluated in the computing center of the Wuppertal University and further analyzed for the determination of the differential cross section of the elastic electron-deuteron scattering. Because of the experiences which were made in this evaluation following can be said: By a pulse-height time-of-flight cut in the hodoscopes a separation of the elastically scattered deuterons from the proton background can be well realized. The comparison with hitherto measurements at a momentum transfer of $q^2=0.5$ (GeV/c)^2 shows that the studied elastic electron-deuteron

scattering and the cross section of this coincidence experiment resulting from this agrees within the error bounds well with earlier experiments. In this coincidence experiment further data at a momentum transfer of $q^2=0.8$ (GeV/c)^2 and $q^2=1.0$ (GeV/c)^2 were taken up. The experience in the evaluation of the data at $q^2=0.5$ (GeV/c)^2 shows that no principal difficulties are to be expected in the data analysis of $q^2=0.8$ (GeV/c)^2 and $q^2=1.0$ (GeV/c)^2.

49237 **Y-italic scaling and final state interactions in ^{3}He(e,e')x-italic.** Gurvitz, S.A.; Tjon, J.A.; Wallace, S.J. (Physics Department, Weizmann Institute of Science, Rehovot, Israel and TRIUMF, Vancouver, British Columbia, Canada V6T 2A3). **34**: No. 2, 648-653(Aug 1986).

Two theoretical approaches to y-italic scaling based on different treatments of final state interactions are compared. Experimental data show scaling in both treatments; however, there is strong disagreement between data and the West prediction based on a Faddeev momentum distribution. Partial inclusion of final state interaction by Sick, Day, and McCarthy substantially improves the comparison with data. Dramatic sensitivity to the treatment of final state interaction suggests that existing theoretical analyses are not decisive.

49238 **Radiative neutron capture by deuterium.** Mitev, G.; Colby, P.; Roberson, N.R.; Weller, H.R.; Tilley, D.R. (Duke University and Triangle Universities Nuclear Laboratory, Durham, North Carolina 27706). **34**: No. 2, 389-400(Aug 1986).

The ^{2}H(n,γ)^{3}H reaction has been studied with polarized and unpolarized neutrons of energies ranging from 9 to 14 MeV. Angular distributions of cross section were measured at E-italic/sub n/ (lab) = 9.0, 10.8, and 14.0 MeV, $\sigma(90^0)$ was measured at 6.85 MeV, and an analyzing-power angular distribution was measured at 9.0 MeV. The results for σ(t-italich-italice-italict-italica-italic) agree with the existing ^{2}H(γ,n)^{2}H data after detailed balancing. The resulting ^{3}He(γ,p)/^{3}H(γ,n) ratio for 90^0 cross sections is 1.1 +- 0.15 down to E-italic/sub x-italic/ = 10.8 MeV. The T-italic-matrix analysis of the data indicates —3% for the E-italic2 contribution to the capture cross section: comparable to that found earlier for ^{2}H(p,γ)^{3}He and in contrast to the predictions [σ/sub n/(E2)/σ/sub p/(E2) = 1/25] of a two-body direct-capture calculation.

49239 **Continuum polarization transfer in 500 MeV proton scattering and pionic collectivity in nuclei.** Rees, L.B.; Moss, J.M.; Carey, T.A.; Jones, K.W.; McClelland, J.B.; Tanaka, N.; Bacher, A.D.; Esbensen, H. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). **34**: No. 2, 627-636(Aug 1986).

A complete set of polarization transfer observables was measured for inclusive 500 MeV proton scattering from ^{2}H, Ca(nat.), and Pb(nat.) at t-italich-italice-italict-italica-italic/sub lab/ = 18.5^0 (q-italic = 1.75 fm/sup -1/). The excitation energy ranged over the entire quasielastic peak from 20 to 100 MeV. Longitudinal and transverse spin-flip probabilities were extracted from the data. These have simple model-dependent connections to the spin-longitudinal and transverse response functions for the heavy targets. Detailed analysis of the data reveals no evidence for collective enhancement in the spin-longitudinal response function. The relation of this analysis to the interpretation of the European Muon Collaboration effect in terms of excess pions is discussed in detail.

49240 **Piezonuclear fusion in isotopic hydrogen molecules.** Siclen, C.DeW.V.; Jones, S.E. (Idaho National Engineering Lab., Idaho Falls, USA). *Journal of Physics G: Nuclear Physics;* **12**: No. 3, 213-221(Mar 1986).

A rough estimate is made of the rate of fusion of the nuclei in a deuterium molecule at room temperature and atmospheric pressure. As the density of the collection of molecules is increased, the fusion rate will likewise increase, in a manner given by an easily derived semi-classical equation. With sufficient experimental data, perhaps obtained through use of a diamond-anvil high-pressure cell, density-dependent expressions for the internuclear potentials of isotopic molecular hydrogen can be constructed and values for the corresponding fusion rates calculated.

6513 Nuclear Properties And Reactions, A=6-19, Theoretical

49241 (ANL—85-22, pp 12) **Dependence of the (e,e'p) reaction in the quasifree region.** Geesaman, D.F.; Green, M.C.; Chant, N.S.; Holt, R.J.; Levenson, S.M.; Maruyama, X.K.; Redwine, R.P.; Roos, P.; Sapp, W.W.; Segel, R.E.; Schiffer, J.P. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A proposal to study the A dependence of the (e,e'p) reaction at absolute value qvector = 540 MeV/c at the Bates electron accelerator has been approved. From the A dependence of the ratio of (e,e'p) coincidence to (e,e') singles events, the macroscopic attenuation of 140 +/- 20 MeV nucleons in nuclei will be deduced. This experiment will be the first experiment at BATES to use the BIGBITE spectrometer. During three shakedown runs in 1984 the spectrometer was brought on-line with a preliminary detector stack. A gas Cerenkov counter is being constructed at Argonne for electron identification in the OHIPS spectrometer. In 1985, the final spectrometer tests will be completed and beam time will be scheduled for the experiment.

49242 (ANL—85-22, pp 13) **Study of the (p,π^-) reaction very close to threshold.** Jacobs, W.W.; Green, M.C.; Brown, J.; Emery, G.T.; Throwe, T.G.; Vigdor, S.E. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have studied the energy dependence of the differential cross section and analyzing powers of the ^{13}C(p,π^-) ^{14}O/sub gs/ reaction for outgoing pion energies of 5-20 MeV. The measurements have been performed at the Indiana University Cyclotron Facility. Most recently the authors have completed measurements for incident proton kinetic energies of 157 and 171 MeV. From this and previous data at 183 and 190 MeV, total cross sections and the s-wave amplitudes have exhibited an energy dependence consistent with that expected from a simple Coulombic interaction of the π^- with the residual nucleus. The p-wave amplitudes show this energy dependence except at 171 MeV where the p-wave amplitude for the incoming proton and target nucleus spins aligned shows a three standard deviation enhancement.

49243 (ANL—85-22, pp 22) **Inelastic scattering of pions by ^{10}B and ^{11}B.** Zeidman, B.; Geesaman, D.F.; Olmer, C.; Morrison, G.C.; Burleson, G.R.; Greene, J.S.; Morris, C.L.; Boudrie, R.L.; Segel, R.E.; Swenson, L.W.; Blanpied, G.S. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The EPICS spectrometer at LAMPF was used in a study of elastic and inelastic scattering of π^+ and π^- by targets of ^{10}B and ^{11}B at T/sub π/ = 162 MeV. Angular distributions between 20^0 and 90^0 were measured in 5^0 steps for π^+ and π^-. In addition, spectra were obtained at 3 angles each at T/sub π/ = 130 and 250 MeV, namely angles corresponding to momentum transfers where the differential cross sections for l = 2, 3, and 4 are maximized. Among the results are evidence for a rotational band built upon (1p/sub 3/2/$^{-1}$,1d/sub 5/2/)$_4$ - neutron particle-hole configurations. A number of states strongly excited at high excitation energy, are compared with theoretical shell-model predictions.

49244 (ANL—85-22, pp 38) **Beta decay of polarized nuclei and the decay asymmetry of ^{8}Li.** Bigelow, R.; Freedman, S.J.; Napolitano, J.; Quin, P.A. (Univ. of Wisconsin, Madison). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Under certain conditions, it is possible to produce vector-polarized radioactive nuclei in reactions with a polarized projectile and an unpolarized target. Using the intense polarized beams at the

University of Wisconsin, the authors have begun a program to study the weak interaction through the beta decay of polarized nuclei produced in this way. Such experiments bear on tests of CVC in light nuclei, sensitive searches for second-class weak currents, and measurements of the weak vector-coupling constant. One may also deduce the values of certain matrix elements. Our effort is presently centering on a study of the energy dependence of the beta-decay asymmetry of ^{8}Li.

49245 (ANL—85-22, pp 39-40) **Proposed new measurement of the ^{10}C superallowed beta decay.** Freedman, S.J.; Holzmann, R.; Kroupa, M.; Lesko, K.; Napolitano, J.; Nelson, J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

To determine the Cabibbo angle the authors have proposed studying the decay $^{10}C \rightarrow {}^{10}B + e^{+} + nu$. Since the dominant error in the ft-value in this system is in the partial lifetime, the authors intend to improve their knowledge of the $O^{+} \rightarrow O^{+}$ branching ratio. Since the two major decay branches lead to excited states in ^{10}B, the branching ratio corresponds to the relative intensity of 718-keV and 1022-keV gamma rays. The authors will produce ^{10}C and measure the relative yield of the two gamma-rays from the β-decay, and then measure the relative gamma-ray efficiencies in a concurrent particle-gamma coincidence experiment. In a series of preliminary runs in August 1984 the authors checked the feasibility of these measurements. The authors observed the deexcitation gamma-rays of the excited states in ^{10}B in coincidence with their respective recoil protons, as a test of the efficiency calibration. The authors also observed the 718-keV gamma-ray from the β-decay. Unfortunately, the low beam current for this series of tests did not allow them to observe the 1022-keV gamma ray from the desired decay branch.

49246 (ANL—85-22, pp 40) **Measurement of a large B(E2) in ^{10}B.** Nelson, J.; Napolitano, J.; Freedman, S.J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

It has been known for some time that the E2 transition strength from the 4.77-MeV, 3^{+} level in ^{10}B to the 0.72-MeV, 1^{+} level was measured to be much larger than one would expect in light nuclei. Kurath has shown that a large enhancement may be expected due to collective effects. However, the experimental value was still nearly three times larger than could be easily accommodated. Using the Physics Division Dynamitron, the authors remeasured this quantity using radiative capture of alpha particles on an evaporation-in-situ ^{6}Li target. Photons of 720 keV were detected using a Ge(Li) spectrometer. The detection efficiency was determined using the well-studied radiative-capture process to the 5.16-MeV state in ^{10}B. The authors find that for the $4.77 \rightarrow 0.72$-MeV transition, $B(E2) = 21 +/- 2\ e^{2}fm^{4}$ whereas Kurath predicts approximately $13e^{2}fm^{4}$.

49247 (ANL—85-22, pp 65) **Fusion cross section behavior for $^{10}B + {}^{13}C$ and $^{11}B + {}^{12}C$.** Mateja, J.F.; Garmon, J.A.; Fields, D.E.; Frawley, A.D.; Kovar, D.G.; Henderson, D.; Ikezoe, H.; Janssens, R.V.F.; Lesko, K.T.; Rosner, G.; Stephens, G.S.F. (Tennessee Technical University, Cookeville). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Time-of-flight measurements for the $^{11}B + {}^{12}C$ system were performed for comparison with results obtained last year for the $^{10}B + {}^{13}C$ system. By studying the total fusion cross section behavior for two different entrance channels which form the same compound nucleus (i.e., ^{23}Na) one hopes to understand whether the observed cross section energy dependence ($4 <$ E/sub Lab/ < 9 MeV/nucleon) is generated by limitations imposed by the compound nucleus or by entrance channel effects. The results of our measurements showed that the observed cross section behaviors for the two entrance channels were not consistent with a fusion limitation produced solely by the properties of the compound nucleus (i.e., by reaching of a critical density of compound nucleus states), and that the cross section behavior appears to be governed by entrance-channel limitations. At the highest energy measured the critical angular momenta for fusion extracted for the two systems were found to have merged to become (within the error bars) the same which suggests that at high bombarding energies a similar critical angular momenta might exist for the two entrance channels.

49248 (ANL—85-22, pp 68) **Projectile-target dependence of incomplete fusion processes.** Kovar, D.G.; Rosner, G.; Janssens, R.V.F.; Henderson, D.; Ikezoe, H.; Kolata, J.J.; Stephans, G.S.F.; Lesko, K.T.; Ungricht, E.; Wilkins, B.; Prosser, F.W. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The results of recent heavy-ion studies indicate that at higher bombarding energies not all central collisions result in the fusion of the projectile and target, but rather that an increasing fraction of these collisions involve the emission of a particle or particles from the projectile or target prior to fusion (i.e., incomplete fusion processes). To obtain information regarding the projectile-target dependence of complete and incomplete fusion processes, measurements of the velocity spectra of the evaporation residues from fusion reactions have been performed using beams of ^{16}O, ^{24}Mg, ^{28}Si, ^{32}S on a series of light- and medium-weight target nuclei. Deviations of the spectra constitute evidence for contributions from incomplete fusion processes and provide an indication of their magnitude. The analysis of these measurements have been completed, revealing evidence that for asymmetric systems (i.e., A/sub proj./ < A/sub targ./ and A/sub proj./ > A/sub targ./) incomplete fusion processes begin to contribute above some threshold velocity, contributing as much as 30% of the ER yields at the highest energy studied (E/sub Lab/ = 9 MeV/nucleon).

49249 (ANL—85-22, pp 70-71) **Evaporation-residue-velocity measurements for fusion of ^{14}N with light target nuclei.** Stephans, G.S.F.; Kovar, D.G.; Janssens, R.V.F.; Ikezoe, H.; Rosner, G.; Lesko, K.T.; Kolata, J.J.; Wilkins, B.; Gonthier, P.L.; de Toledo, A.S.; Szanto, E. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

There is strong evidence from investigations of incomplete momentum transfer that these processes involve the emission of high-energy light fragments, especially α particles, before fusion occurs. The ^{14}N measurements were performed to investigate the influence of nuclear structure in the onset of incomplete momentum-transfer reactions and to establish its energy dependence. Effort this year was spent in analysis of data obtained in TOF measurements of evaporation residues (ER) in ^{14}N-induced reactions on targets ranging in mass $12 <$ A/sub target/ < 48 at beam energies of 5.5, 7.0, and 9.2 MeV/nucleon at ANL and 15, 25, and 35 MeV/nucleon at MSU. In addition, a fusion angular distribution was measured for $^{14}N + {}^{40}Ca$ at 9.2 MeV/nucleon at ANL in order to obtain the fusion cross-section. A TOF system including two channel plates and a Si dE-E telescope was used to produce precise velocity measurements and also allow detection of high-energy light particles. The analysis of the ER velocity spectra revealed that the fraction of the beam momentum transferred to the compound system is roughly 100% at 5.5 MeV/nucleon, 92% at 15 MeV/nucleon, 72% at 25 MeV/nucleon, and 64% at 35 MeV/nucleon.

49250 (ANL—85-22, pp 141) **Electroproduction of Δ's from light nuclei.** Lee, T.S.H.; Kleppinger, W. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The (e,e') study can examine the dependence of Δ-nucleus dynamics on the nuclear density and on the Δ momentum. The electromagnetic current owing to the Δ excitation can be straightforwardly calculated in this approach by adding a $\gamma N \rightleftharpoons \Delta$ vertex interaction to the meson-exchange Hamiltonian. In 1985, the authors had carried out a calculation of (e,e'Δ) from light nuclei. The important Δ-nucleus interaction in the final state was treated by

using an optical potential extracted from the Δ-hole model of pion-nucleus scattering. Their calculation illustrated the strong dependence of the (e,e') cross section on the Δ-nucleus potential. The result was used in a proposal by the Argonne group as a part of the scientific justification of an experiment to be run at SLAC on Δ-production by GeV electrons.

49251 (ANL—85-22, pp 142) **Study of (e,e'X) reaction in the nuclear shell model.** Kleppinger, W.E. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The (e,e'X) reaction (where X can be nucleon or other hadrons) is one of the main research subjects which will be investigated in the near future using high-duty factor electron accelerators. The authors have developed a microscopic approach to the problem assuming that the nuclear states can be described by the nuclear shell model. As a first step, a computer program for calculating the (e,e'N) cross sections has been developed. The authors have used it to study (e,e'N) for ^{12}C and ^{40}Ca targets using realistic single-particle wavefunctions for the bound nucleons and distorted waves for the outgoing nucleons. Their results agree very well with the existing data both in the magnitude and energy dependence.

49252 (ANL—85-22, pp 147) **Effect of Δ(1236) on M1 properties of 1p-shell nuclei.** Kurath, D.; Lawson, R.D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The effect of the delta resonance on the magnetic dipole properties of the 1p-shell nuclei with A ≧ 11 has been investigated. When the quark model phasing between the central and tensor transition potentials is used, the delta has little effect on the magnetic moments of the yrast $3/2^-$ and $1/2^-$ states. The effect on M1 transition matrix elements is to reduce them by about 6% with some tendency towards a smaller reduction for the lighter nuclei. For seven transitions this quenching improves the agreement between theory and experiment. However, three transitions in the A = 11 and 12 nuclei already have shell model values which are too small so that the suppression worsens the agreement between theory and experiment. Thus the almost state independent reduction in M1 transition rates predicted when the effect of the delta is included does not resolve some of the discrepancies between calculation and experiment. These results have been published.

49253 (ANL—85-22, pp 148) **Analysis of inelastic scattering of pions.** Lee, T.S.H.; Kurath, D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The analysis of inelastic scattering of pions on nuclei at energies near the Δ resonance has led to a number of interesting results. 1. The approximate formulae representing the DWIA cross section for particular strong multipoles were refined. 2. In ^{16}O and ^{12}C it is known that the excitation of the lowest 3^- state requires an enhancement factor when calculated as a (0 h omega) → (1 h omega) transition. Similar strong E3 transitions in ^{14}C and ^{13}C when studied both by (e,e') and (π,π') experiments show that the data can be fit by enhancement of only the isoscalar amplitude. Whereas in ^{16}O and ^{12}C the amplitude-enhancement factor is found to be $E_0 \sim 2$, $E_0(^{14}C) \sim 1.55$ and $E_0(^{13}C) \sim 1.65$. 3. The analysis of observed stretched M4 transitions in ^{14}C shows good agreement with calculated (π^+,π^-) cross-section ratios for the two strongest states, but also shows disagreement between experiment and calculation in other states. A paper reporting these results has been accepted for publication.

49254 (ANL—85-22, pp 148) **Spin expectation values for nuclear ground states.** Kurath, D. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A current experiment measures nucleon-nucleon spin correlations in scattering of neutrons with 500 to 800 MeV from a polarized proton target. Such targets generally also contain some percentage of boron, carbon and nitrogen isotopes so it is necessary to estimate the contribution to scattering from polarization of these background nuclei. As input to such an estimate, expectation values of S/sub z/ for both neutrons and protons were calculated for a range of nuclei with shell-model wave functions. Checks on such values were also made using measured magnetic moments of isospin-mirror nuclei and self-mirrored nuclei. The agreement between calculated and empirical values for the spin expectation values is generally quite good.

49255 (DOE/ER/10706—T1) **(p, Vector, π/sup +-/) reactions on Be at 650 MeV.** Hoeistad, B.; Barlet, M.; Adams, G.S.; Gazzaly, M.; Aas, B.; Pauletta, G.; Irom, F.; Jones, K.; McGill, J.A. (Texas Univ., Austin (USA). Dept. of Physics; South Carolina Univ., Columbia (USA). Dept. of Physics; Minnesota Univ., Minneapolis (USA). Dept. of Physics; California Univ., Los Angeles (USA). Dept. of Physics; Los Alamos National Lab., NM (USA)). Jun 1986. Contract AS05-80ER10706. 10p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014072.

Angular distributions of the differential cross section and the analyzing power for the ^9Be(p vector, π^+)^{10}Be and the ^9Be(p vector, π^-)^{10}C reactions have been measured at 650 MeV. A phenomenological comparison, based on a model for pion emission from the target nucleus, is made between the analyzing power from the (p vector, π) data and polarization data from πN scattering. 7 refs., 4 figs.

49256 (INIS-BR—476, pp 40) **Faddeev calculations in the three-particle model for the A=18 system: Energy levels of ^{18}F.** Miyake, H.; Mizukami, A.; Ueta, K. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49257 (INIS-BR—476, pp 39) **Deuteron-induced reactions on ^{16}O.** Ueta, K. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49258 (INIS-BR—476, pp 20-21) **sup(10, 11)B(p,n)sup(10, 11)C reactions between E sub(p)=13.7 and 14.7 MeV.** Schelin, H.R.; Wylie, W.R.; Cardoso Junior, J.L.; Pessoa, E.F.; Douglas, R.A. (Centro Tecnico Aeroespacial, Sao Jose dos Campos, Brazil. Inst. de Estudos Avancados; Sao Paulo Univ., Brazil. Inst. de Fisica; Universidade Estadual de Campinas, Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49259 (INIS-mf—10190) **Determination of the spectroscopic quadrupole moment and the polarizability of ^7Li by Coulomb scattering of oriented Li ions.** Weller, A. (Marburg Univ. (Germany, F.R.). Fachbereich 13 Physik). 1984. 103p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752582.

Following an earlier experiment of Egelhof et al. for the determination of the spectroscopic quadrupole momentum Qsub(S) of ^7Li under application of a beam of oriented ions deviations from the Rutherford cross section in the Coulomb scattering were observed. In order to determine the measured quantity, the tensor analyzing power T_{20} (order of magnitude < or approx. 0.01) with sufficient accuracy an especially for this purpose developed and optimized measurement apparature was used the main component of which is an ionization chamber with rotational symmetry and a large spatial angle (approx.= 1.8 sr). By this it was possible to study systematically the dependence of the analyzing power T_{20} on

energy and target. Thereby an accuracy could be reached which allows to determine not only quadrupole momentum and B(E2) value but additionally the tensor strength tau of the polarizability (10^{-4} effect) with a relative error of less than 20%. For the first time beside the strength parameter tau_{12} which characterizes the influence of the polarizability on the first excited state of ^{7}Li also the corresponding parameter tau_{11} of the ground state was measured. The different data sets could be consistently described in the framework of a quantum-mechanical coupled-channel theory for Coulomb excitation by means of a single parameter set Qsub(S),B (E2), tau_{11}, and tau_{12}. The nuclear momenta extracted from the data Qsub(S) = (-37.0 +- 0.9)emb, B(E2) = (8.3 +- 0.4)e^2fm^4, tau_{11} = (0.23 +- 0.04)fm^3, and tau_{12} = (0.23 +- 0.04)fm^3 confirm especially recent theoretical papers which start from a cluster structure of the ground-state wave function of ^{7}Li.

49260 (INIS-mf—10409) **Transverse excitations of ^{19}F.** Donne, A.J.H. (Vrije Univ., Amsterdam (Netherlands)). 25 Sep 1985. 136p. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703150.

In this thesis aspects of the structure of the nucleus ^{19}F are discussed as a result of transverse electron-scattering experiments, with emphasis on the ground state. The magnetization distribution of this state has been obtained from the measurement of electrons scattered from ^{19}F at backward angles. An introduction to the electron-scattering formalism is presented briefly together with the interpretation of electron-scattering results in terms of the nuclear shell model. The experimental apparatus for the measurement of electron scattering through an angle of 180° is described. This instrumentation has been installed in the low-energy facility (LEF) at NIKHEF-K. Simultaneously with the study of the magnetic ground state distribution of ^{19}F, excited states of this nucleus up to an energy of 4.4 MeV have also been investigated, mainly from data obtained in the EMIN station. Also for these states, the shell-model calculations have been the guide to determine their structure. Includes Dutch summary; 126 refs.; 51 figs.; 10 tabs.

49261 (LBL—21650) **3-body final states in peripheral heavy-ion collisions: nuclear clustering structure and projectile excitation revisited.** Chan, Y.; Chavez, E.; Gazes, S.B.; Kamermans, R.; Schmidt, H.R.; Siwek-Wilczynska, J.; Stokstad, R.G.; Wilczynski, J. (Lawrence Berkeley Lab., CA (USA). Nuclear Science Div.). Feb 1986. Contract AC03-76SF00098. 8p. (CONF-860270—9). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013200.

From 4. winter workshop on nuclear dynamics; Copper Mountain, CO, USA (24 Feb 1986).

Even though peripheral heavy-ion collisions are less violent than their central counterparts, the large energy exchange between the reactants often leaves the primary products in excited particle-unstable states whose subsequent decay leads to 3 or more nuclei emerging in the final exit channel. These post-reaction, predominantly sequential de-excitation processes can sometimes provide interesting structural information about the parent nuclei. In fact, provided these processes are well understood, one can employ them as probes for studying initial properties of the fragments. This report discusses results of two experiments that deal with (1) non-statistical, rare decay modes of the projectile, and (2) internal excitation energy of the projectile- and target-like fragments in peripheral collisions. The physics addressed in each is different, but the experimental and data-analysis techniques are so similar that it is relevant to join them together.

49262 (NEANDC(J)—117/U, pp 32-40) **Revision of the neutron nuclear data of lithium.** Chiba, S. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Neutron nuclear data of ^{6}Li and ^{7}Li stored in JENDL-3PR1 were revised, mainly on the basis of the double differential cross sections measured at Osaka and Tohoku Universities. Results of the analyses of some integral experiments were also taken into consideration. The present revision was restricted to the neutron emitting reactions. The revised data reproduce well the measured double differential cross sections.

49263 (NEANDC(J)—117/U, pp 119-140) **Measurements of double-differential neutron emission cross sections at Tohoku University.** Baba, M. (Tohoku Univ., Aramaki-Aoba, Sendai, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

A brief summary is presented for measurements and analyses of double-differential neutron emission cross sections for fusion reactor materials performed at the Tohoku University Dynamitron facility. The experiments and the typical results are described for / sup 6,7/Li, ^{9}Be, C, O, Fe, Ni and Pb. The experimental results for emission spectra and scattering cross sections are discussed in comparison with JENDL-3PR1.

49264 (NEANDC(J)—117/U, pp 141-148) **Nuclear data testing on integral experiments of lithium spheres.** Sugiyama, K.; Yamamoto, J.; Iguchi, T. (Tohoku Univ., Aramaki-Aoba, Sendai, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Uncertainty on the neutron nuclear data of lithium isotopes is discussed concerned with integral experiments using two kinds of lithium spheres, 40 cm and 120 cm in diameter. Experimental results of neutron leakage spectra and tritium production rates indicate that the cross section of ^{7}Li(n,n'α)T in the data file JENDL-3 PR2 is preferred in comparison with the values in ENDF/B-IV, and there are some discrepancies for the (n,2n) cross sections of lithium in both files.

49265 (NEANDC(J)—117/U, pp 160-170) **Comparison between measurements of the neutron spectra from materials used in fusion reactors and calculations using JENDL-3PR1.** Hashikura, H.; Oka, Y.; Kondo, S. (Univ. of Tokyo, Tokai-mura, Naka-gun, Ibaraki, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

JENDL-3PR1 which includes very important nuclides for analysis of fusion blanket experiments has been already released. The accuracy of the nuclear data has been checked by the comparison of the integral measurements with the calculational results using JENDL-3PR1. Several problems are pointed out.

49266 (NEANDC(J)—117/U, pp 171-182) **Clean benchmark experiments and analyses at FNS.** Maekawa, H. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Two types of clean benchmark experiments have been carried out at the FNS (Fusion Neutronics Source) facility. They are integral experiments and time-of-flight experiments. The former includes integral experiments on cylindrical assemblies with: (1) 60-cm thick lithium oxide (Li_2O), (2) 60-cm thick graphite, and (3) 40-cm thick Li_2O followed by 20-cm thick graphite. Various reaction rates such as tritium production rate and neutron spectra were measured in these experiments. The time-of-flight experiments were conducted to measure angle-dependent neutron spectra leaking from: (1) Li_2O, (2) graphite, and (3) lithium-metal slab assemblies. These experiments were numerically analyzed by making use of the DOT3.5 transport code with newly processed 125-group cross-sec-

tion sets, i.e., JENDL-3PR1, JENDL-3PR2, ENDF/B-IV, and ENDF/B-V (^{13}C only). It was found that the calculations based on JENDL-3PR1 and JENDL-3PR2 predicted tritium production rates of ^{6}Li and ^{7}Li better than those based on ENDF/B-IV. These analytical results are expected to provide useful information for the future development of the JENDL-3 nuclear data file.

49267 (UCRL—94405) Coupled-channel analysis of neutron scattering from ^{12}C between 9 and 15 MeV. Hansen, L.F.; Meigooni, A.S. (Lawrence Livermore National Lab., CA (USA); Yale Univ., New Haven, CT (USA). Dept. of Therapeutic Radiology). Jul 1986. Contract W-7405-ENG-48. 5p. (CONF-8605166—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013025.

From International conference on fast neutron physics; Dubrovnik, Yugoslavia (26 May 1986).

A deformed and energy dependent phenomenological optical model potential and coupled-channel formalism for deformed nuclei have been used in the analysis of elastic and inelastic (Q = 4.439 MeV) scattering, and analyzing power for neutrons scattered from ^{12}C in the energy range of 9 to 15 MeV. 6 refs., 1 fig., 1 tab.

49268 Spin dependence of the isospin-forbidden decay ^{8}Be(E-italic/sub x-italic/ = 27.5 MeV)→d+^{6}Li. Soderstrum, J.P.; Knutson, L.D. (Department of Physics, University of Wisconsin, Madison, Wisconsin 53706). 34: No. 2, 401-407(Aug 1986).

The first T-italic = 2 state in ^{8}Be (E-italic/sub x-italic/ = 27.483 MeV) has been studied by means of the isospin-forbidden resonance in the reaction d+ ^{6}Li→α+α. Angular distributions of the cross section and of the four analyzing powers for the reaction ^{6}Li(d-arrow-right,α) ^{4}He have been measured at energies above, below, and on resonance. Off-resonance analyzing power measurements have also been obtained for ^{2}H(^{6}Li-arrow-right,α) ^{4}He. Because of the symmetry properties of the reaction, the number of independent collision matrix elements is fairly small, and this makes it possible to determine the matrix elements directly by fitting the data. By comparing the matrix elements, one can determine partial widths (Γ_0 and Γ_2) for decay of the ^{8}Be state into d+ ^{6}Li states with channel spin 0 and 2. The measured ratio of the partial widths is $\Gamma_2/\Gamma_0 = 0.322 +- 0.091$.

49269 Radiative pion capture on /sup 13/C. Singham, M.K.; Tabakin, F. (Theoretical and Medium Energy Physics Divisions, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). 34: No. 2, 637-642(Aug 1986).

It is found that the differential cross sections for /sup 13/C(π^+,γ)/sup 13/N /sub g.s./ for 115.5 MeV kinetic energy pions can be understood within the framework of a distorted wave impulse approximation, suggesting that core polarization and precursor effects give small contributions. It is further found that, within the limits of current nuclear photopion theory, the data for the radiative capture process are incompatible with earlier measurements for the inverse reaction /sup 13/C(γ,π^-)/sup 13/N /sub g.s./. It is shown that the reconciliation of the two sets of data places stringent demands on possible modifications to the theory.

6514 Nuclear Properties And Reactions, A=20-38, Theoretical

REFER ALSO TO CITATION(S) 49118

49270 (ANL—85-22, pp 26) **Polarized proton scattering from ^{26}Mg.** Geesaman, D.F.; Zeidman, B.; Olmer, C.; Bacher, A.D.; Emergy, G.T.; Glover, C.W.; Nann, H.; Jones, W.P.; van der Werf, S.Y.; Segel, R.E.; Lindgren, R.A. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have measured the angular distributions and analyzing powers for polarized proton scattering from ^{26}Mg at 135-MeV incident energy at the Indiana University Cyclotron Facility. Angular distributions were measured in 5° steps from a laboratory angle of 10° to 60° for states in the excitation energy range from 0 to 20 MeV. Five 6$^-$ states have been identified based on the characteristic angular distributions of the cross sections and analyzing powers at 9.17-, 11.98-, 12.48-, 12.85- and 18.05-MeV excitation energy.

49271 (ANL—85-22, pp 27) **Transverse electron scattering by ^{26}Mg.** Geesaman, D.F.; Hicks, R.S.; Huffman, R.L.; Lindgren, R.A.; Maruyama, X.K.; Olmer, C.; Plum, M.A.; Wildenthal, B.H. (Indiana Univ., Bloomington). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The inelastic scattering of electrons by ^{26}Mg was studied using the 180° inelastic-electron-scattering facility at the Bates Linear Accelerator Laboratory. Measurements were made at incident energies of 140, 163, 193 and 212 MeV to map the first peak of the form factors for M6 transitions. Five 6$^-$ states were identified at 9.12, 12.49, 12.91, 14.41, and 18.06 MeV excitation. The 18.06-MeV state was identified as a T = 2, 6$^-$ level.

49272 (ANL—85-22, pp 69) **Time-of-flight measurements of evaporation residues from ^{32}S + ^{24}Mg.** Kolata, J.J.; Hinnefeld, J.; Kovar, D.G.; Janssens, R.V.F.; Lesko, K.T.; Stephans, G.S.F.; Rosner, G.; Wilkins, B.; Henderson, D.; Gonthier, P.L.; Prosser, F.W. (Univ. of Notre Dame, South Bend, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

As a further investigation of the mass-asymmetry dependence of this reaction, the system ^{32}S + ^{24}Mg which forms the same compound nucleus was studied. A time-of-flight detector system was used to measure the angular distributions and the velocity spectra for individually resolved evaporation residue masses in reactions induced at E/sub lab/ (^{32}S) = 290, 250, and 200 MeV. The velocity spectra were found to be consistent, within the uncertainties of the measurements, with those expected for complete fusion at all three bombarding energies. The preliminary values for the total ER cross sections extracted are found to fall intermediate between those observed for ^{16}O + ^{40}Ca and ^{28}Si + ^{28}Si. Comparison with model calculations are presently underway.

49273 (INIS-BR—476, pp 24) **Measurement of stopping powers of heavy ions on silicon using sandwich targets.** Rotberg, V.H.; Vilela, M.M.; Villari, A.C.C. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49274 (INIS-BR—476, pp 1) **Study of the α-transfer reaction ^{24}Mg(^{16}O, ^{20}Ne)^{20}Ne at E sub(CM)=27.8 MeV.** Lichtenthaler Filho, R.; Lepine-Szily, A.; Villari, A.C.C.; Portezan Filho, O.; Fernandes, M.A.G. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49275 (INIS-BR—476, pp 2-3) **Effect of α-transfer reactions on the elastic scattering of ^{28}Si+ ^{16}O at E sub(CM) =31.6 MeV.** Portezan Filho, O.; Lepine-Szily, A.; Fernandes, M.A.G.; Lichtenthaler Filho, R.; Villari, A.C.C.; Rotberg, V.H. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49276 /sup 36,38/Ar(d-bar,α)/sup 34,36/Cl reactions induced by tensor polarized deuterons. Bhat, C.M.; Tagishi, Y.; Ludwig, E.J.; Brown, B.A. (University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27514 and Triangle Universities Nuclear Laboratory, Durham, North Carolina 27706). 34: No. 2, 736-739(Aug 1986).

Exact finite-range distorted-wave Born approximation analyses of cross section and vector and tensor analyzing power angular distributions for some /sup 36,38/Ar(d-arrow-right,α) transitions induced by 16 MeV polarized deuterons have been performed using full s-italicd-italic-shell model wave functions and including a D-italic-state amplitude for the α particle. The L-italic-mixing ratios R-italic for several unnatural parity transitions have been determined from comparisons of the calculations with the tensor analyzing power data. Shell-model calculations are found to be in agreement with the experimentally obtained phases of R-italic, while the predicted magnitudes agree well in some cases.

49277 Analyzing power of /sup 27/Al(n-arrow-right,n-arrow-right$_0$) at 14 and 17 MeV and the isospin dependence of the optical model potential. Martin, P.; Walter, R.L. (Department of Physics, Duke University, Durham, North Carolina 27706 and Triangle Universities Nuclear Laboratory, Durham, North Carolina 27706). **34**: No. 2, 384-388(Aug 1986).

The analyzing powers of 14 and 17 MeV neutrons elastically scattered from /sup 27/Al have been measured. Two spherical optical model analyses of these and previously published data have been performed. The first one, which concentrated only on neutron cross section data at 14 and 17 MeV and the new analyzing powers, led to a new set of spherical optical model parameters, including a spin-orbit strength and a diffuseness of about 5.6 MeV and 0.36 fm, respectively. The second incorporated cross section and analyzing power data for proton scattering at slightly higher energies, to compensate for Coulomb energy differences. The data were successfully described with a set of parameters which included isospin-dependent potentials with isospin parameters V-italic$_1$/sub R-italic/ = 22.4 MeV and W-italic$_1$/sub D-italic/ = 15.7 MeV.

49278 Entrance channel limit on the fusion of /sup 28/Si with /sup 12/C at high energy. Harmon, B.A.; Thornton, S.T.; Shapira, D.; Gomez del Campo, J.; Beckerman, M. (Department of Physics, University of Virginia, Charlottesville, Virginia 22901 and Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **34**: No. 2, 552-561(Aug 1986).

Cross sections for the fusion of /sup 28/Si+/sup 12/C have been measured at center of mass bombarding energies of 39, 43.5, 48, and 54 MeV. Velocity and energy spectra of reaction products having charge Z-italic> or =12 and mass number A-italic> or =24 were studied at several angles between t-italich-italice-italict-italica-italic/sub lab/ = 2° and 13°. Separation of fusion from other processes was made by comparison of kinematic calculations to measured spectra. The extracted critical angular momentum (l-italic/sub cr//sup fus/) of 22h-dash-bar indicates the existence of an entrance-channel-imposed limit on the high energy fusion cross section. More symmetric systems forming the same compound nucleus, /sup 40/Ca, have considerably larger limiting angular momenta. This result is consistent with the previous observation of a maximum angular momentum of 22h-dash-bar (relative to the entrance channel) for the orbiting dinuclear complex found in studies of back-angle deeply inelastic scattering of /sup 28/Si and /sup 12/C.

49279 High-spin (f-italic/sub 7/2/)/sup A-40/ states in /sup 47/Ti, /sup 47/Sc, /sup 44/Ca, /sup 45/Ca, and /sup 48/Ti via /sup 36/S+/sup 14/C fusion-evaporation reactions. Warburton, E.K.; Beausang, C.W.; Fossan, D.B.; Hildingsson, L.; Piel, W.F. Jr.; Becker, J.A. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). **34**: No. 1, 136-151(Jul 1986). Contract AC02-76CH00016.

/sup 36/S(/sup 14/C,x-italicny-italicpz-italicαγ) reactions were used to extend our knowledge of the high-spin states of /sup 47/Ti, /sup 47/Sc, /sup 44/Ca, /sup 45/Ca, and /sup 48/Ti. The decay schemes were constructed from γγ-coincidence data and γ-ray angular distributions and excitation functions. The angular distributions also provided information on spin-parity assignments and multipole mixing ratios. Lifetime information was extracted from analysis of the γ-ray Doppler shifts observed in both the angular distribution and γγ-coincidence data. Assuming the probable J-italic/sup π/ assignments are correct, the yrast schemes for all five nuclei extend to the highest spin allowed for (f-italic/sub 7/2/)/sup A-40/. Results are compared to shell-model predictions generated in three different configuration spaces: (f-italic/sub 7/2/), (d-italic/sub 3/2/,f-italic/sub 7/2/), and the full (f-italic,p-italic) shell.

6515 Nuclear Properties And Reactions, A=39-58, Theoretical

49280 (ANL—85-22, pp 23) Excitation of 8⁻, particle-hole states in ^{54}Fe. Geesaman, D.F.; Lawson, R.D.; Olmer, C.; Bacher, A.D.; Boudrie, R.L.; Morris, C.L.; Lindgren, R.A.; Burleson, G.R.; Greene, S.J.; Cottingame, W.B.; Segel, R.E. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The scattering of π^+ and π^- by ^{54}Fe was studied at T/sub π/ = 162 MeV utilizing the EPICS system at LAMPF. Particular interest was placed upon the excitation of 8⁻ states that result from particle-hole configurations of the form (1f/sub 7/2/$^{-1}$,1g/sub 9/2/)$_{8^-}$. In an analysis of the pion and electron scattering data, the isoscalar and isovector amplitudes were extracted for each 8⁻ state. The summed isoscalar strength was 11% of the one-particle 3-hole limit while 38% of the isovector strength was observed.

49281 (ANL—85-22, pp 24) Isoscalar quenching in the excitation of 8⁻ states in ^{52}Cr. Geesaman, D.F.; Zeidman, B.; Morrison, G.C.; Boudrie, R.L.; Morris, C.L.; Burleson, G.R.; Greene, S.J.; Swenson, L.W. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The EPICS system at LAMPF has been used in an investigation of the properties of 8⁻ states in ^{52}Cr excited by the scattering of 162-MeV π^+ and π^-. The experiment is directed toward answering a fundamental question concerning quenching in inelastic scattering. Preliminary analysis of the data indicates that the yrast 8⁻ state is predominantly a neutron particle-hole excitation and is observed at an excitation energy of ~8 MeV, somewhat lower than anticipated.

49282 (ANL—85-22, pp 25) Excitation of 8⁻ states in ^{52}Cr. Zeidman, B.; Geesaman, D.; Karbon, O.; Morrison, G.C.; Fagg, L.W.; Sober, D.I.; Maruyama, X.K.; Lindgren, R.A.; deVries, H.; van Hienen, J.F.K. (Univ. of Birmingham, England). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The 8⁻ states formed by particle-hole excitations involving (1g/sub 9/2/,1f/sub 7/2/$^{-1}$)$_{8^-}$ configurations in ^{52}Cr have been studied by scattering electrons with kinetic energies ranging from 170 MeV to 260 MeV at NIKHEF, Amsterdam. In addition to the T = 3 state at ~15.47 MeV excitation, T = 2 states have been observed at energies ranging from 8- to 12-MeV excitation.

49283 (ANL—85-22, pp 54) Inelastic scattering and single-nucleon transfer reactions induced by ^{16}O on ^{40}Ca. Stephans, G.S.F.; Kovar, D.G.; Henning, W.; Kolata, J.J.; Rehm, K.E.; Rosner, G.; Ikezoe, H.; Parko, R.; Vojtech, R. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Effort has been spent in the analysis of results obtained at ANL in measurements of elastic and inelastic-scattering, and single-nucleon transfer reactions observed in ^{16}O + ^{40}Ca at E/sub lab/ = 150 MeV. The energy resolutions of 150 keV obtained in the measurements using the split-pole magnetic spectrograph make possible the investigation of transitions to resolved states in the final nuclei. Finite-range DWBA calculations were successful in reproducing the strength of all single-nucleon pick-up and stripping reactions leaving one of the two nuclei in its ground state. By contrast, similar calculations failed to reproduce the strength of ^{16}O-induced transfer reactions on ^{208}Pb at similar energies above the Coulomb barrier. DWBA predictions of the shape of the ^{16}O + ^{3,5,6}Ca trans-

fer angular distributions, which are forward peaked, were only fair. CCBA calculations have been performed for the 150-MeV ^{16}O + ^{40}Ca elastic and inelastic data as well as for older data at lower energies (i.e., 45, 60, and 75 MeV) in order to study the energy dependence.

49284 (ANL—85-22, pp 63) **Proximity effects in deep-inelastic collisions of ^{32}S + ^{58}Ni.** Gonthier, P.L.; Hichwa, B.P.; Kovar, D.G.; Vineyard, M.F.; Stephans, G.S.F.; van den Berg, A.; Wilkins, B. (Hope College, Holland, MI). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

An experiment was performed to measure proximity effects in the deep-inelastic reactions of ^{32}S + ^{58}Ni at a projectile energy of 250 MeV. The goal of the experiment was to obtain information regarding the time scales of the dissipation of energy and transfer of nucleons between deep-inelastic products. The deep-inelastic fragments were detected in two Si detector dE-E telescopes, positioned at +/- 40 degrees, which determined the fragments energy and nuclear charge Z. The energy spectra and angular correlation of light-particles in coincidence with the deep-inelastic fragments were measured in eight Si dE-E telescopes positioned at forward and backward angles. Analysis of the results is in progress at this time.

49285 (ANL—85-22, pp 66) **Fusion evaporation residues and the distribution of reaction strength in ^{16}O + ^{40}Ca and ^{28}Si + ^{28}Si reactions.** Kolata, J.J.; Hinnefeld, J.; Kovar, D.G.; Vineyard, M.F.; Henderson, D.; Janssens, R.V.F.; Lesko, K.T.; Menchaca-Rocha, A.; Prosser, F.W.; Sanders, S.J.; Stephans, G.S.F. (Univ. of Notre Dame, South Bend, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In measurements performed previously at ANL, studying the two entrance channels ^{16}O + ^{40}Ca and ^{28}Si + ^{28}Si which form the same compound nucleus ^{56}Ni, it was found that at higher bombarding energies (E/sub Lab/ > 5-7 MeV/nucleon) the distributions of reaction strength was dramatically different. Although the total reaction cross section behaviors for the two entrance channels are similar, the total evaporation residue (ER) cross sections for ^{28}Si + ^{28}Si decrease rapidly with increasing bombarding energies and up to the highest energy studied show no evidence for incomplete fusion processes. For ^{16}O + ^{40}Ca the ER cross section remains constant at approximately 1 barn with increasing bombarding energy and shows evidence of increasing contributions from incomplete fusion. To better understand this apparent dependence on the mass asymmetry in the entrance channel, coincidence measurements between evaporation residue-like products and heavy ions on the opposite side of the beam were performed for the two systems at E/sub Lab/ = 8 MeV/nucleon.

49286 (ANL—85-22, pp 71-72) **Coincidence measurements between evaporation residues and light particles produced in ^{16}O + ^{40}Ca and ^{28}Si + ^{40}Ca reactions.** Maguire, C.; Kui, Z.; Ma, W.C.; Robinson, S.; Watson, D.; Work, G.; Ikezoe, H.; Kovar, D.G.; Rosner, G.; Stephans, G.S.F.; Ungricht, E. (Vanderbilt Univ., Nashville, TN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In order to investigate the reaction mechanism responsible for the production of the evaporation residues in the reactions ^{16}O + ^{40}Ca and ^{28}Si + ^{40}Ca at bombarding energies of E/sub lab/ = 9 MeV/nucleon, coincidence measurements between the evaporation residues and light particles (M < 4) had been performed in 1983. During the current year these data were reduced and compared to model calculations. Comparison of the observed energy spectra with Monte Carlo simulation calculations revealed no evidence for pre-equilibrium emission in the case of ^{28}Si + ^{40}Ca, but evidence for a high energy component in the proton and alpha spectra observed in the ^{16}O + ^{40}Ca reaction. One estimates that as much as 30% of the evaporation residue yields produced in ^{16}O + ^{40}Ca arise from incomplete fusion processes. These observations provide additional support to a growing body of evidence that the threshold for incomplete fusion processes depends on the mass asymmetry in the entrance channel and in particular to the relative velocity of the projectile and target to the reference frame of the compound nucleus, and that the mechanism for incomplete fusion may be associated with the Fermi motion of the individual nucleons in the interaction nuclei.

49287 (INIS-BR—476, pp 35) **Reactive content of the proton-nucleus impulse-approximation Dirac optical potential.** Carlson, B.V.; Isidro Filho, M.P.; Hussein, M.S. (Centro Tecnico Aeroespacial, Sao Jose dos Campos, Brazil. Inst. de Estudos Avancados; Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49288 (INIS-BR—476, pp 22-23) **Measurement of stopping powers of heavy ions in solids.** Rotberg, V.H.; Vilela, M.M.; Villari, A.C.C.; Ribas, R.V. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49289 (INIS-BR—476, pp 10-13) **Fusion of the ^{16}O + sup(46, 48, 50) Ti systems near and below the Coulomb barrier.** Liguori Neto, R.; Acquadro, J.C.; Toledo, A.S. de; Carlin Filho, N.; Coimbra, M.M.; Crema, E.; Gomes, P.R.S. (Sao Paulo Univ., Brazil. Inst. de Fisica; Universidade Federal Fluminense, Niteroi, Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49290 (INIS-BR—476, pp 17-18) **Nuclear structure effects on the reaction cross section of ^{16}O + sup(46, 50) Ti.** Werner, J.A.; Toledo, A.S. de; Added, N.; Coimbra, M.M.; Carlin Filho, N.; Szanto, E.M.; Guimaraes, V. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49291 (INIS-BR—476, pp 10) **On the influence of valence protons in fusion cross sections near the Coulomb barrier.** Toledo, A.S. de; Szanto, E.M.; Cormier, T.M.; Stwertka, P.M.; Herman, M.; Nicolis, N. (Sao Paulo Univ., Brazil. Inst. de Fisica; Rochester Univ., NY, USA). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49292 (ORNL/TM—9964) **Update of ENDF/B-V Mod 3 iron: neutron-producing reaction cross sections and energy-angle correlations.** Fu, C.Y.; Hetrick, D.M. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 25p. (ENDF—341). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014340.

An update of the ENDF/B-V Mod-3 evaluation for natural iron is described. The cross sections of (n,n') and (n,2n) reactions are revised. Energy-angle correlations in the secondary (n,n') neutrons are introduced in the ENDF/B-V formats. Anisotropic angular distributions are provided for the secondary neutrons in (n,2n), (n,np), and (n,nα) reactions. Revelant integral results, microscopic data, and nuclear model calculations that influence the revised results are summarized. 54 refs., 9 figs., 2 tabs.

49293 Elastic scattering of 65 MeV positive and negative pions from nickel isotopes. Fick, B.; Blecher, M.; Gotow, K.; Wright, D.; Boudrie, R.L.; Burman, R.L.; Mack, D.; Ritchie, B.G.; Roos, P.G.; Escalante, J.A.; Mishra, C.S.; Preedom, B.M.; Whisnant, C.S. (Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061). **34**: No. 2, 643-647(Aug 1986).

Angular distributions of elastic differential cross sections were obtained at 65 MeV using positive and negative pions scattered from /sup 58/Ni, /sup 60/Ni, and /sup 64/Ni. The data were compared to predictions using the Michigan State University optical potential. These predictions are not in good agreement with the data. The negative pion cross sections are more poorly described than the positive pion cross sections. The p-italic-wave part of the potential is observed to be especially sensitive to this Coulomb-nuclear interference effect.

49294 Nuclear collective flow as a function of projectile energy and mass. Doss, K.G.R.; Gustafsson, H...; Gutbrod, H.H.; Kampert, K.H.; Kolb, B.; Loehner, H.; Ludewigt, B.; Poskanzer, A.M.; Ritter, H.G.; Schmidt, H.R.; Wieman, H. (Gesellschaft fuer Schwerionenforschung, D-6100 Darmstadt, West Germany and Nuclear Science Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). **57**: No. 3, 302-305(21 Jul 1986).

The dependence of collective nuclear flow on multiplicity and beam energy for Ca + Ca, Nb + Nb, and Au + Au collisions has been measured with the Plastic Ball detector at the Bevalac. Event by event the data are analyzed with the transverse-momentum method and a new quantitative measure of the flow effect is extracted. It is expected that comparison of the present systematic results with model calculations will lead to a more precise determination of the nuclear-matter equation of state.

49295 Reaction /sup 58/Ni(πi,2p-italic) at 160 MeV. Burger, W.J.; Beise, E.; Gilad, S.; Redwine, a.R.P.; Roos, P.G.; Chant, N.S.; Breuer, H.; Ciangaru, G.; Silk, J.D.; Blanpied, G.S.; Preedom, B.M.; Ritchie, B.G.; Blecher, M.; Gotow, K.; Lee, D.M.; Ziock, H. (Department of Physics and Laboratory for Nuclear Science, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). **57**: No. 1, 58-61(7 Jul 1986).

Data for the /sup 58/Ni(π^+,2p-italic) reaction at T-italicπ = 160 MeV were obtained for a number of angle pairs. The resultant angular correlations for T-italic$_1$+T$_2$>160 MeV (guaranteed pion absorption) peak at a separation angle corresponding to absorption on a deuteron at rest. However, simple estimates of initial- and final-state scatterings suggest that less than 50% of the absorption cross section arises from absorption on nucleon pairs. The data show little evidence for scattering of pions before absorption on nucleon pairs.

6516 Nuclear Properties And Reactions, A=59-89, Theoretical

REFER ALSO TO CITATION(S) 49265

49296 (ANL—85-22, pp 52-53) **Study of transfer processes in the systems ^{58}Ni + ^{58}Ni and ^{58}Ni + ^{64}Ni at energies in the vicinity of the barrier.** Rehm, K.E.; van den Berg, A.; Henning, W.; Wolfs, F.L.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

For the systems ^{58}Ni + ^{58}Ni and ^{58}Ni + ^{64}Ni large differences in the subbarrier fusion cross sections have been observed, which were attributed in some theoretical models to the coupling of 2-neutron transfer channels with positive Q-values. The authors have measured the magnitude and the energy dependence of transfer reactions at energies in the vicinity of the barrier. The particle identification was performed with the magnetic spectrograph utilizing the new parallel plate timing detector for mass identification. The transfer processes are dominated by the one-neutron transfer reactions (^{59}Ni, ^{59}Ni) while the cross section for two-neutron transfer (^{59}Ni, ^{60}Ni) is smaller by about a factor of 3.4. The average effective Q-value for these reactions is about -1 MeV.

49297 (ANL—85-22, pp 79) **Fusion of ^{78}Se + ^{78}Se and ^{82}Se + ^{82}Se.** Janssens, R.V.F.; Khoo, T.L.; Henning, W.; Kuehn, W.; Lesko, K.T.; Radford, D.C.; Ronningen, R.M.; van den Berg, A. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

These measurements are part of a series directed towards understanding the suppression of neutron emission observed in fusion of ^{64}Ni + ^{92}Zr → ^{156}Er and not in fusion of ^{12}C + ^{144}Sm → ^{156}Er. The channel yields have been measured in the fusion reaction of both systems in order to extract the neutron multiplicity distributions. These will be compared with results from our earlier experiments for ^{156}Er and with published results for ^{16}O + ^{148}Nd → ^{164}Er. Data analysis is in progress.

49298 (ANL—85-22, pp 96) **Half-life of ^{60}Fe.** Kutschera, W.; Billquist, P.J.; Frekers, D.; Henning, W.; Jensen, K.J.; Ma, X.Z.; Mausner, L.F.; Paul, M.; Pardo, R.; Rehm, K.E.; Smither, R.K. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The half-life of ^{60}Fe has been measured to be T/sub 1/2/ = (1.49 +/- 0.27) x 10^6 y, significantly longer than the previous measurement of Roy and Kohman who in 1957 reported a value of 3 x 10^5 y uncertain by a factor of 3. The new value was obtained from measurements of specific activity through the grow-in of the ^{60}Co daughter nucleus and of the ^{60}Fe concentration. The material was produced by spallation of copper with 191 MeV protons in the Brookhaven Linac Isotope Producer (BLIP). A ^{60}Fe/Fe ratio of (9.54 +/- 1.40) x 10^{-8} was measured with the tandem-linac in conjunction with the Enge split-pole spectrograph, using such a system for the first time for a quantitative AMS measurement.

49299 (ANL—85-22, pp 147) **Shell-model study of $_4$^{100}Nb.** Amusa, A.; Lawson, R.D. (Univ. of Ife, Ile-Ife, Nigeria). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

There is a considerable body of experimental results for the energy levels and decay modes of $_{41}$^{99}Nb. This evidence is compared with a shell-model study which assumes a closed $_{38}$^{88}Sr core so that the configuration of ^{99}Nb consists of three protons and two neutron holes in the 1g/sub 9/2/ and 2p/sub 1/2/ single-particle levels. The calculation can account for most of the observed spin assignments and lifetimes for M1 and E2 decay, although there are a few discrepancies. A paper has been submitted for publication.

49300 (EGG-M—15186) Evaluation of β intensity data in nuclear decay schemes: comments on some pitfalls. Reich, C.W. (EG and G Idaho, Inc., Idaho Falls (USA)). 1986. Contract AC07-76ID01570. 11p. (CONF-8606171—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013451.

From IAEA meeting on the coordination of the international nuclear structure and decay data evaluation network; Gre.oble, France (2 Jun 1986).

Some of the problems which arise in the evaluation of decay-schemes data to obtain values for the intensities of β transitions are discussed. As examples of these problems, the decay schemes of ^{87}Br and ^{233}Pa are examined. No specific solutions to these problems are offered; but by pointing them out to the participants in the International Nuclear Structure and Decay Data Evaluation Network, it is hoped that a general understanding of them can be gained, which may ultimately lead to a consistent means of dealing with them. 14 refs., 2 figs., 1 tab.

49301 (INIS-BR—476, pp 5-6) **Study of heavy ion transfer reactions for ^{16}O + sup(63,65) Cu systems at energies near the Coulomb barrier.** Ramirez, G.; Pereira, D.; Acquadro, J.C.; Sala, O. (Chile Univ., Santiago. Facultad de Ciencias; Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49302 (INIS-BR—476, pp 7-8) **Fusion cross section measurements for the sup(63,65) Cu + ^{16}O systems.** Pereira, D.; Acquadro, J.C.; Sala, O.; Chamon, L.C.; Rocha, A.C.; Tenreiro, C.F.; Ramirez, G. (Sao Paulo Univ., Brazil. Inst. de Fisica; Chile Univ., Santiago. Facultad de Ciencias). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49303 (INIS-BR—476, pp 9) **Detection of fission like process in the sup(63,65) Cu + ^{16}O systems.** Pereira, D.; Acquadro, J.C.; Sala, O. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49304 (INIS-BR—476, pp 14-17) **Complete fusion and some evidences of incomplete fusion of the ^{14}N + ^{59}Co system.** Chagas, E.F.; Gomes, P.R.S.; Liguori Neto, R.; Acquadro, J.C.; Crema, E.; Carlin Filho, N.; Coimbra, M.M. (Centro Tecnico Aeroespacial, Sao Jose dos Campos, Brazil. Inst. de Estudos Avancados; Universidade Federal Fluminense, Niteroi, Brazil. Inst. de Fisica; Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49305 (NEANDC(J)—117/U, pp 149-159) **14 MeV integral experiment at OKTAVIAN to check differential data of secondary neutrons.** Yamamoto, J. (Osaka Univ., Yamadaoka, Suita-shi, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-gun, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Differential data for Fe and Pb in ENDF/B-IV, ^{12}C in B-V and ^{7}Li in B-IV, JENDL-3PR1 and PR2 were checked with regard to secondary neutron spectra from (n,n') and (n,2n) reactions by 14 MeV neutrons. This verification was done by making use of neutron energy spectra measured in 14 MeV integral experiments at the OKTAVIAN facility of Osaka University. In comparison with transport calculations by 1-D Sn code NITRAN, it was pointed out that there is some uncertainty in emission spectra from (n,2n) reaction with high energy threshold.

49306 (PNL-SA—14160) **Ultralow background searches for β β-decay, cold dark matter and solar axions.** Avignone, F.T.; Ahlen, S.P.; Brodzinski, R.L.; Dimopolous, S.; Drukier, A.K.; Gelmini, G.; Lynn, B.W.; Miley, H.S.; Reeves, J.H.; Spergel, D.N. (Pacific Northwest Lab., Richland, WA (USA); South Carolina Univ., Columbia (USA). Dept. of Physics; Boston Univ., MA (USA). Dept. of Physics; Stanford Univ., CA (USA). Dept. of Physics; Harvard-Smithsonian Center for Astrophysics, Cambridge, MA (USA); Harvard Univ., Cambridge, MA (USA). Dept. of Physics). Jul 1986. Contract AC06-76RL01830. 6p. (CONF-860741—9). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013592.

From International symposium on weak and electromagnetic interactions in nuclei; Heidelberg, F.R. Germany (1 Jul 1986).

An ultralow background Ge detector in the Homestake gold mine is applied to searches for 0 nu $\beta\beta$-decay, cold dark matter candidates and invisible axions from the sun. A large body of low background Ge data imply <m/sub nu/> 2.3 eV. Particles with spin independent Z^0 exchange interactions and masses between 20 GeV and 5 TeV are excluded as dominant in the galactic halo. Finally, axions with F/2x'/sub e/ < 0.5 x 10^7 GeV are also ruled out. 11 refs., 3 figs.

49307 **Search for the double-β decay of /sup 76/Ge.** Avignone F.T. III; Brodzinski, R.L.; Evans J.C. Jr.; Hensley, W.K.; Miley, H.S.; Reeves, J.H. (University of South Carolina, Columbia, South Carolina 29208). **34**: No. 2, 666-677(Aug 1986).

A systematic study of the radioactive background in materials used in Ge-detector fabrication was conducted prior to the construction of an ultralow-background, 135 cm^3 prototype detector. The background from primordial radioactivities in the new system was lower by factors of between 1.5 x 10^3 and 2.5 x 10^4 when compared to commercial low-background detectors. Data were collected for 8089 h with the detector located 1438 m underground, resulting in improved lower limits for the half-lives for both two-neutrino and neutrinoless $\beta\beta$ decay of /sup 76/Ge to the ground state of /sup 76/Se and for the neutrinoless $\beta\beta$ decay to the first excited state of /sup 76/Se. The results of four recent theoretical calculations are compared in detail and used to extract limits on <m-italic/sub ν/>, the Majorana mass of ν/sub e-italic/, and on the amplitudes of the couplings of right-handed Majorana neutrinos. The best combination of the lowest background data from recent experiments results in a new limit T-italic/sub 1/2/°/sup ν/approx. >3 x 10/sup 23/ yr, corresponding to <m-italic/sub ν/><2.4 eV neglecting right-handed couplings or 2.8 eV including both right-handed neutrino couplings.

49308 **Experimental investigation of double-beta decay in /sup 82/Se.** Elliott, S.R.; Hahn, A.A.; Moe, M.K. (Physics Department, University of California, Irvine, California 92717). **56**: No. 24, 2582-2585(16 Jun 1986).

A time projection chamber with a selenium double-beta decay source as the central electrode has yielded a lower limit of 1.0 x 10/sup 20/ yr at 68% confidence level for the two-neutrino half-life of /sup 82/Se. This limit is consistent with the results of geochemical measurements, and disagrees with the shorter half-life predictions of nuclear theory. For the neutrinoless mode we find a corresponding lower limit of 7 x 10/sup 21/ yr, also at 68% confidence level.

6517 Nuclear Properties And Reactions, A=90-149, Theoretical

49309 (ANL—85-22, pp 55) **Quasielastic transfer strength near the barrier for ^{58}Ni + Sn.** Rehm, K.E.; van den Berg, A.; Freeman, W.S.; Henning, W.; Lee, L.L.; Lesko, K.T.; Schiffer, J.P.; Stephans, G.S.F.; Wolfs, F.L.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In continuation of a program to study the interactions between /sup 58,64/Ni and the even Sn-isotopes, the authors have measured direct reaction channels at energies close to the barrier using the newly developed parallel plate timing detector in the split-pole magnetic spectrograph. Angular distributions for quasielastic neutron transfer reactions measured for the different Sn targets are shown. The integrated cross sections at E/sub lab/ = 247 MeV change from 15 mb for ^{58}Ni + ^{112}Sn to 200 mb for ^{58}Ni + ^{124}Sn. This dependence can be understood as a consequence of the underlying Q-values for the transfer reactions. Comparing these transfer cross sections with the fusion cross sections, the authors again observe that transfer reactions are the dominant processes for reactions induced by medium-weight projectiles at energies in the vicinity of the Coulomb barrier.

49310 (ANL—85-22, pp 57-58) **Quasielastic transfer for /sup 58,64/Ni induced reactions on even-A tin isotopes well above the barrier.** van den Berg, A.M.; Freeman, W.S.; Henning, W.; Lee, L.L.; Lesko, K.T.; Rehm, K.E.; Schiffer, J.P.; Stephans, G.S.F.; Wolfs, F.L.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The Argonne tandem-linac combination was used to study quasielastic transfer reactions induced by ^{58}Ni beams at 330 MeV and ^{64}Ni beams at 341 and 380 MeV, respectively, on the even-A / sup 112,116,120,124/Sn isotopes. Reaction products were momentum analyzed with the split-pole spectrograph and detected in a gas-filled position-sensitive focal-plane detector system. Angular distributions for elastic (+ inelastic) scattering were analyzed using the generalized Fresnel scattering model, which yields the (reduced) reaction cross section. The angular distributions for quasielastic neutron transfer reactions are bell-shaped and peak at angles roughly 10 degrees smaller than the quarter point angle for elastic scattering. The angle-integrated cross sections for one- and two-neutron pickup (stripping) reactions increases (decreases) as a function of the target mass A.

49311 (ANL—85-22, pp 59-60) **Elastic and inelastic scattering for ^{58}Ni + /sup 116,124/Sn.** van den Berg, A.M.; Freeman, W.S.; Henning, W.; Lee, L.L.; Lesko, K.T.; Rehm, K.E.; Schiffer, J.P.; Stephans, G.S.F.; Wolfs, F.L.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

As part of a systematic study of Ni-induced reactions the authors have measured elastic and inelastic scattering to low-lying states for the ^{58}Ni + ^{116}Sn and ^{58}Ni + ^{124}Sn systems at E/sub lab/ = 330 MeV. Thin targets (50 $^{+}$ g/cm^{2}) and the two-wire position information from the heavy-ion focal plane detector of the Enge split-pole spectrograph allowed the authors to determine a virtual focal plane where the energy resolution was ~ 1.5 MeV. The momentum spectra were analyzed using the peakfitting code AUTOFIT and fixed peak positions for the ground-state transitions and the transitions to the 2_1^+ states and their mutual excitation in the Ni- and Sn-isotopes. Results of preliminary Coupled Channel Born Approximation (CCBA) calculations for the system ^{58}Ni + ^{124}Sn are shown.

49312 (ANL—85-22, pp 61-62) **Quasielastic neutron transfer reactions on samarium isotopes.** van den Berg, A.M.; Rehm, K.E.; Kovar, D.G.; Kutschera, W.; Stephans, G.S.F. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

As part of a systematic study of quasielastic transfer reactions on medium-heavy and heavy targets using Ni beams from the Argonne LINAC, the authors studied the ^{58}Ni + Sm reaction at E/sub cm/ = 245 MeV. The targets used were /sup 144,149,150,152,154/Sm which become increasingly deformed with mass number A. The split-pole magnetic spectrograph was used to momentum analyze the reaction products which were detected in a focal-plane gas counter providing unambiguous mass and Z identification. As observed in other heavy-ion-induced transfer reactions, the angular distributions for quasielastic (Q > -30 MeV) neutron-transfer reactions peak at angles somewhat smaller than the quarter-point angle for elastic scattering and they can be fitted with a Gaussian function to extract the angle-integrated cross sections. The cross section for all ^{58}Ni-induced neutron transfer processes increases from σ/sub n/ = 148 mb for the spherical ^{144}Sm to σ/sub n/ = 224 mb for the deformed ^{154}Sm. The authors used the diffraction-model code FAST to investigate whether this increase can be attributed to Q-value and angular momentum matching or might be due to the increase in deformation for the heavier targets.

49313 (ANL—85-22, pp 73-74) **Angular momentum dependent fission barriers for /sup 170-188/pt.** Lesko, K.T.; Henning, W.; Rehm, K.E.; Rosner, G.; Schiffer, J.P.; Stephans, G.S.F.; Zeidman, B.; Freeman, W.S. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have continued their analysis of the fusion-fission cross sections for the reactions /sup 58,64/Ni + /sup 112-124/Sn. The angular distributions of fission fragments for all systems and the angle integrated cross sections have been extracted. The fission excitation functions were added to the previously measured evaporation residue cross sections to obtain the total fusion excitation functions and, subsequently, the fission probability functions. The authors have modelled the decay of the compound nuclei /sup 170-188/Pt using the statistical decay code of Puehlhofer, CASCADE. They have succeeded in reproducing the observed fission competition for all 14 systems using a common set of input parameters for the model.

49314 (ANL—85-22, pp 75) **Limits to fusion in heavy systems.** Henning, W.; Freeman, W.S.; Lee, L.L.; Lesko, K.T.; Stephans, G.S.F. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

All attempts to produce compound nuclei with Z $\geq$ 110 which survive prompt fission have failed up to now. To investigate such systems the authors have started experiments to produce heavy compound nuclei in ^{42}S and ^{36}S induced reactions on targets of ^{171}Yb, ^{181}Ta, /sup 181,184/W, ^{208}Pb and ^{238}U. The measurements were performed with the use of an electrostatic deflector. The data, evaporation residue yields and delayed α particles, are presently being analyzed.

49315 (ANL—85-22, pp 77) **l-distributions in fusion of ^{64}Ni + ^{92}Zr and ^{13}C + ^{144}Sm measured with the Darmstadt-Heidelberg crystal ball.** Khoo, T.L.; Janssens, R.V.F.; Kuehn, W.; Metag, V.; Ruckelshausen, A.; Habs, D.; Groger, H.; Repnow, R.; Hlavac, S.; Simon, R.; Duchin, G. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have previously observed that in fusion of ^{64}Ni and ^{92}Zr there is a suppression of neutron emission, whereas in fusion of ^{13}C and ^{144}Sm into the same compound nucleus the observed neutron multiplicity distribution is close to that expected. Possible explanations for the suppression in terms of anomalously energetic neutrons, unusually large gamma decay widths or an unknown yrast line have been ruled out. It has been suggested that the explanation may lie in a tail to very high l-values arising from, for instance, zero point fluctuations in the near-barrier ^{64}Ni-induced reaction. Therefore, it is germane to directly measure the l-distributions, which in addition, are of crucial interest in understanding the enhancement of sub-barrier fusion cross-sections. It is found that with 225 MeV ^{64}Ni, which is near the barrier, there is significantly larger yield at higher l-values than predicted by an empirical model due to Kailas & Gupta. This observation is consistent with an enhancement of sub-barrier fusion. In contrast, at 239 MeV, l/sub max/ ~ 37 is close to the Kailas-Gupta value. Furthermore, no tail to unexpectedly high-l values is observed, ruling out this possibility as an explanation for the neutron suppression. The l-distributions for the ^{13}C-induced reactions are rather similar to the expected empirical ones.

49316 (ANL—85-22, pp 87-88) **Lifetimes of very high spin states in ^{147}Gd.** Bjornholm, S.; Borggreen, J.; Pedersen, J.; Sletten, G.; Janssens, R.V.F.; Khoo, T.L.; Radfored, D.C. (Niels Bohr Institute, Copenhagen, Denmark). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Our first results on the spectroscopy of very high spin states in ^{147}Gd have been published recently. Shell model calculations tell us also that within a few more units of angular momentum the nu-

cleus now has to find extraordinary ways of producing spin, either by exciting nucleons from the next major shell or by collective rotation. In an attempt to distinguish between these two modes, lifetimes and feeding times were measured by the recoil distance method. The analysis started last year is still continuing. At this stage the results can be summarized as follows: (i) Information on the lifetimes has been obtained for all states along the yrast line with spins I ≧ 75/2 and I ≦ 59/2. (ii) The measured lifetimes confirm the single particle nature of the various states (only small hindrances or enhancements with respect to the Weisskoff estimates are found).

49317 (ANL—85-22, pp 93) **Shell-model states in N = 81-83 nuclei.** Broda, R.; Daly, P.J.; Grabowski, Z.W.; McNeill, J.; Helppi, H.; Janssens, R.V.F.; Khoo, T.L.; Lawson, R.D.; Radford, D.C. (Purdue Univ., West Lafayette, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Using Ni beams from the tandem-linac accelerator and (/sup 58,60/Ni, pn) and (/sup 58,60/Ni, 2pn) reactions, the authors have completed a series of measurements on ^{146}Tb, ^{147}Dy, ^{146}Ho, ^{149}Er, ^{150}Tm and ^{151}Yb. In all the odd-odd nuclei, 10^+ millisecond isomers were observed. Their decay was studied in detail. All observations are in excellent agreement with shell-model considerations, which predict that the 10^+ member of the (πh/sub 11/2/, nuh/sub 11/2/$^{-1}$) multiplet should be a yrast isomer, decaying to the (πh/sub 11/2/, nud/sub 3/2/$^{-1}$)7^- level. These results have been submitted for publication. The level structure of ^{147}Dy has now been established up to ~ 3.7 MeV. Three isomeric levels were observed with respective half-lives of 7, 400 and 16 ns. Guided by the results of shell model calculations, most of the observed levels can be interpreted as seniority-three states arising from the coupling of s/sub 1/2/, d/sub 3/2/ and h/sub 11/2/ neutron holes with πh/sub 11/2/^{2}. The analysis of the data obtained for ^{149}Er and ^{151}Yb is still in progress.

49318 (ECN—179) **On the statistical evaluation of inconsistent measurement results illustrated on the example of the ^{90}Sr half-life.** Zijp, W.L. (Netherlands Energy Research Foundation, Petten). Dec 1985. 28p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703217.

The problem how to make an objective evaluation of inconsistent numerical observations made by different authors or laboratories on the same physical quantity is dealt with. The problem is treated in a practical way in the light of the example on the half-life of ^{90}Sr, and it is to some extent a response to a document by Gray (1985) on the same topic. 5 refs.; 14 tables.

49319 (INIS-mf—10174, pp X/51) **Gas proportional telescope used to investigate rare reactions induced by 3 MeV neutrons.** Szarka, I.; Florek, M.; Oravec, J.; Holy, K.; Helfer, H.; Jahn, U. (Komenskeho Univ., Bratislava, Czechoslovakia. Prirodovedecka Fakulta; Technische Univ., Dresden, German Democratic Republic. Sektion Physik). 1985. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703198. (CONF-8510205—Absts.).

From 3. international conference on low-level counting; Bratislava, Czechoslovakia (21 Oct 1985).

49320 (INIS-mf—10407) **Single proton transfer reactions on odd-even nuclei. Nuclear structure studies in the platinum and tin regions through stripping and pickup reactions.** Blasi, N. (Rijksuniversiteit Groningen (Netherlands)). 29 Oct 1984. 196p. NTIS (US Sales Only), PC A09/MF A01. File Number DE86703151.

This thesis is devoted to the study of one proton transfer reactions, performed with the use of the magnetic spectrograph QMG/2 of the KVI, in two regions of the mass table. Stripping and pickup reactions on the odd-A target nuclei ^{193}Ir and ^{197}Au are described in the first part. The experimental spectroscopic factors obtained are used to test several collective models that are based on coupling between bosons (phonons) and fermions. In the second part, the proton stripping reactions on ^{113}In and ^{115}In are studied. Shell model calculations are performed and applied to the experimental results. Includes Dutch summary; 130 refs.; 60 figs.; 36 tabs.

49321 (INR—1950/IA/PL/A) **Alpha emitters in the region from Ce to Os.** Rurarz, E. (Institute of Nuclear Research, Warsaw (Poland)). 1982. 55p. Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland.

A survey is given of experimental information for alpha emitters in the range from Ce to Os. From experimentally known alpha decay energies some mass values of very neutron deficient nuclei were derived. The knowledge of these mass values makes possible the calculations of the electron capture and proton binding energies. In the range from Sm to Os the parameters of the Geiger-Nuttall type formula for calculation of alpha decay half-lives are derived. The alpha decay barrier penetrabilities and reduced widths for 95 alpha emitters in the region from Ce to Os are calculated and discussed.

49322 (KFK—4071) **Charge radii and moments of tin nuclei by laser spectroscopy.** Anselment, M.; Bekk, K.; Hanser, A.; Hoeffgen, H.; Meisel, G.; Goering, S.; Rebel, H.; Schatz, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik). Apr 1986. 21p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86752598.

The isotope shift and hyperfine structure of the optical Sn I resonance transition $5p^2\ ^3P_0 -> 5p6s\ ^3P_1$ at lambda=286.3 nm have been studied for 18 Sn nuclei including 2 isomers. Laser induced resonance fluorescence from a collimated atomic beam of tin was observed using a tunable cw dye laser with frequency doubler. The electromagnetic nuclear moments and changes of the mean square charge radii of the nuclear charge distributions were determined. The results are discussed with respect to the information they provide on the nuclear structure of the nuclei investigated; they are compared with various theoretical models.

49323 (LBL—21532) **Intermediate mass fragment emission from 8 to 40 MeV/u.** Charity, R.J.; McMahan, M.A.; Bowman, D.R.; Liu, Z.H.; McDonald, R.J.; Wozniak, G.J.; Moretta, L.G.; Bradley, S.; Kehoe, W.L.; Megnerey, A.C. (Lawrence Berkeley Lab., CA (USA). Nuclear Science Div.; Maryland Univ., College Park (USA). Dept. of Chemistry; Washington Univ., St. Louis, MO (USA). Dept. of Chemistry; Bari Univ. (Italy). Ist. di Fisica; Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.); Lawrence Livermore National Lab., CA (USA). Nuclear Chemistry Div.). Feb 1986. Contract AC02-85ER40210;AC03-76SF00098. 8p. (CONF-860270—10). NTIS, PC A02/MF A01; GPO Dep. File Number DE86012800.

From 4. winter workshop on nuclear dynamics; Copper Mountain, CO, USA (24 Feb 1986).

Experimental data for fragmentation in the reactions ^{93}Nb = ^{9}Be, ^{12}C, and ^{27}Al are presented. Data were obtained from the LBL BEVALAC (25 to 40 MeV/u), GSI Unilac (11 to 18 MeV/u) and LBL SuperHILAC. These measurements imply, that over a large range of bombarding energies, intermediate mass fragments are produced by the bineary decay of a compound nucleus-like system. At low bombarding energies, these systems are associated with a complete fusion reaction, whereas for the larger energies the initial system is formed in an incomplete fusion reaction. The data shows a smooth evolution from the lower energies, where the statistical emission of intermediate mass fragments is well established, to the higher, intermediate energy regime. 4 refs., 2 figs.

49324 (OUP—83-35) **Deep-lying νhsub(11/2) hole states in ^{145}Nd.** Ramsoey, T.; Rekstad, J.; Henriquez, A.; Ingebretsen, F.; Guttormsen, M.; Hammaren, E.; Thorsteinsen, T.F. (Oslo Univ. (Norway). Fysisk Inst.; Jyvaeskylae Univ. (Finland). Dept. of Physics; Bergen Univ. (Norway). Dept. of Physics). 1983. 25p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703242.

The level scheme of ^{148}Nd has been studied by measuring γ-rays following the (^{3}He, α) pick-up reaction. Up to the neutron binding energy of Bsub(n)=5.8 MeV, the γ-ray multiplicity has been measured as a function of excitation energy. Assuming that Fermi gas conditions are appropriate in the continuum part of the

level scheme, the level density parameter is determinted to be a=(14.5 +- 2.0) MeV^{-1}. The νhsub(11/2) strength function has been extracted by means of a coincidence filter technique. An almost uniform νhsub(11/2) strength function in the region 3.2-5.8 MeV of excitation energy, and a summed strength of only 50% of the shell model strength, indicate a fragmentation to higher energies.

49325 **Mass of /sup 146/Gd.** Mann, L.G.; Lanier, R.G.; Struble, G.L.; Naumann, R.A.; Kouzes, R.T. (Nuclear Chemistry Division, Lawrence Livermore National Laboratory University of California, Livermore, California 94550). 34: No. 2, 729-731(Aug 1986).

We have measured the Q-italic value of the /sup 148/Gd(p,t)/sup 146/Gd reaction by comparison with the /sup 65/Cu(p,t)/sup 63/Cu calibration reaction. The /sup 148/Gd target was fabricated from material produced in a Ta target. The tritons were analyzed with a quadrupole—dipole-dipole-dipole spectrometer. By combining the (p,t) Q-italic value with the /sup 148/Gd mass, we obtain -76 096 +- 6 keV for the /sup 146/Gd mass excess.

49326 **Decay of 83-min /sup 139/Ba to levels of /sup 139/La and the decay of 18-min /sup 141/Ba to levels of /sup 141/La.** Faller, S.H.; Stone, C.A.; Robertson, J.D.; Chung, C.; Aras, N.K.; Walters, W.B.; Gill, R.L.; Piotrowski, A. (Department of Chemistry, University of Maryland, College Park, Maryland 20742). 34: No. 2, 654-665(Aug 1986).

The level structures of odd proton /sup 139/La and /sup 141/La have been studied in γ-ray singles, Compton-suppressed singles, coincidence, and angular correlation experiments. No evidence was observed to support the existence of any levels in /sup 139/La in the gap between the 166-keV d-italic/sub 5/2/ level and the 1209-keV $(1/2)^+$ level, even though data were accumulated long enough to observe indirect feeding of the $(1/2)^+$ level. Additional spin and parity assignments are suggested for a number of levels in /sup 141/La based on angular correlation measurements.

49327 **Spectroscopic study of the high-spin states in /sup 135/Pr.** Semkow, T.M.; Sarantites, D.G.; Honkanen, K.; Abenante, V.; Adler, a.L.A.; Baktash, C.; Johnson, N.R.; Lee, I.Y.; Oshima, M.; Schutz, Y.; Chen, Y.S.; Saladin, J.X.; Chen, C.Y.; Dietzsch, O.; Larabee, A.J.; Riedinger, L.L.; Griffin, H.C. (Department of Chemistry, Washington University, St. Louis, Missouri 63130). 34: No. 2, 523-535(Aug 1986).

An in-beam spectroscopic study of /sup 135/Pr was made using a 91 MeV /sup 120/Sn(/sup 19/F,4n) reaction. Two positive parity bands were observed based on the g-italic/sub 7/2/ proton orbital with $(\pi,\alpha) = (+, +- (1/2))$. A strongly populated negative parity (-,-(1/2)) band was also seen (based on the h-italic/sub 11/2/ proton orbital). The unfavored (-,+(1/2)) structure may also be present. In both the positive and negative parity bands the first backbend is attributed to the alignment of two h-italic/sub 11/2/ protons on the basis of cranked shell model calculations. The crossing frequency was found to increase in the (-,-(1/2)) band because of blocking of the h-italic/sub 11/2/ orbital. The alignment of protons in /sup 135/Pr causes a shift of γ towards ~+10° with nearly collective prolate deformation. Also, there is some evidence for a second backbend and an upbend in the case of positive and negative parity bands, respectively. They could result from the alignment of the h-italic/sub 11/2/ neutrons.

49328 **Coincidence measurements of intermediate mass fragments produced in /sup 32/S-induced reactions on Ag at E-italic/A-italic = 22.5 MeV.** Fields, D.J.; Lynch, W.G.; Nayak, T.K.; Tsang, M.B.; Chitwood, C.B.; Gelbke, C.K.; Morse, R.; Wilczynski, J.; Awes, T.C.; Ferguson, R.L.; Plasil, F.; Obenshain, F.E.; Young, G.R. (National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824). 34: No. 2, 536-551(Aug 1986).

Single- and two-particle inclusive cross sections for the production of light nuclei and intermediate mass fragments, 3< or =Z-italic< or =24, were measured at angles well beyond the grazing angle for /sup 32/S-induced reactions on Ag at 720 MeV. Information about fragment multiplicities and reaction dynamics was extracted from measurements of light particles, intermediate mass fragments, and targetlike residues in coincidence with intermediate mass fragments. Incomplete linear momentum transfer and non-compound-particle emission are important features of collisions producing intermediate mass fragments. About half of the incident kinetic energy in these collisions is converted into internal excitation. The mean multiplicity of intermediate mass fragments is of the order of 1. Particle correlations are strongly enhanced in the plane which contains the intermediate mass fragment and the beam axis.

49329 **(INR—1931/1/9A/PL/A) Evaluation of (n, 2n) reaction cross sections for ^{46}Ti, ^{107}Ag and ^{109}Ag.** Adamski, L.; Herman, M.; Marcinkowski, A.; An Jong Do. (Institute of Nuclear Research, Warsaw (Poland)). 1982. 26p. Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland.

Paper contains an evaluation of four reaction cross sections: ^{46}Ti(n, 2n)^{45}Ti (from threshold to 20 MeV), ^{107}Ag(n, 2n)^{106}Ag (from threshold to 20 MeV), ^{107}Ag(n, 2n) sup(106m)Ag (from threshold to 28 MeV), ^{109}Ag (n, 2n) sup(108g)Ag (from threshold to 20 MeV). Recommended curves are based on experimental data partly supported by calculation using a combined compound-precompound model. For the ^{107}Ag(n, 2n) sup(106g)Ag reaction the results of own measurements in the energy range 13.0-17.9 MeV are given.

6518 Nuclear Properties And Reactions, A=150-189, Theoretical

49330 (ANL—85-22, pp 28-32) **High-spin, two-particle, one-hole, stretched states excited by proton induced negative pion production in nuclei.** Green, M.C.; Brown, B.A.; Brown, J.; Jacobs, W.W.; Jolivette, P.L.; Throwe, T.G.; Vigdor, S.E.; Ward, T.E. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have observed the cross section and analyzing-power distributions of 2p-1h configurations from targets of oxygen, calcium, and strontium. Each target isotope was chosen to have the highest filled neutron orbital correspond to an empty proton orbital. Respectively, the observed states are based on the configurations $(1d/sub\ 5/2/)^3$, $(1f/sub\ 7/2/)^3$, and $(1g/sub\ 9/2/)^3$ having spins as large as $13/2^+$, $19/2^-$, and $25/2^+$. From the authors' strontium measurements, they have identified previously unknown $25/2^+$ and $21/2^+$ states in ^{90}Zr. Relative cross sections for these two transitions are well reproduced by simple model calculations. The analyzing power distributions for the stretched-state transitions seem to show a yet unexplained mass-independent signature. This past fall the authors carried out measurements on samarium and lead isotopes hoping to identify high-spin states based on $(1h/sub\ 11/2/)^3$ and $(1i/sub\ 13/2/)^3$ 2p-1h configurations. On-line spectra indicate some reaction cross section at the predicted excitation, though experimental energy resolution may prevent identification of particular states. Off-line data analysis is currently under way at IUCF.

49331 (ANL—85-22, pp 75) **Evaporation residue cross-sections in fusion of ^{64}Ni + ^{92}Zr and ^{13}C + ^{144}Sm.** Janssens, R.V.F.; Holzmann, R.; Henning, W.; Khoo, T.L.; Lesko, K.T.; Stephans, G.S.F.; Radford, D.C.; van den Berg, A. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

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As part of a series of measurements to understand the origin of neutron suppression in ^{64}Ni + ^{92}Zr fusion, the authors have measured the evaporation residue cross-sections. These measurements have also a direct bearing on the problem of enhanced sub-barrier fusion. Residue cross-section in fusion of ^{64}Ni + ^{92}Zr and ^{13}C + ^{144}Sm have been measured over a wide range of bombarding energies, including those below the Coulomb barrier. Using a technique previously developed here at ANL, the residues were

separated from the beam by electrostatic deflection and detected at 4 angles including 0°. Analysis of the data is nearing completion.

49332 (ANL—85-22, pp 80-81) **Feeding times of high spin states in /sup 152,154/Dy: probes of nuclear structure above the yrast line.** Khoo, T.L.; Chowdhury, P.; Frekers, D.; Janssens, R.V.F.; Azgui, F.; Emling, H.; Grosse, E.; Michel, C.; Simon, R.S.; Spreng, W.; Wollersheim, H.J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Measurements of feeding times of high spin yrast states up to spin 30 h in ^{154}Dy and 36 h in ^{152}Dy were utilized to obtain information about possible spin dependent shape changes. The reactions ^{26}Mg (^{134}Xe,5n), ^{124}Sn (^{34}S,4n) and ^{26}Mg (^{128}Xe,5n) ^{128}Sn, (^{34}S,4n) were used to populate the high spin states in ^{154}Dy and ^{152}Dy, respectively. The experiments with sulfur beams were conducted at ANL, while those with Xe were performed at GSI. Feeding times as well as lifetimes were determined with the recoil distance technique. Slow feeding times into high spin states of ~ 10 ps were observed, showing for the first time that they are not always fast (< 1 ps), as has been previously assumed.

49333 (ANL—85-22, pp 82-83) **Total γ-spectrum from ^{153}Ho measured with BGO Compton-suppressed spectrometers.** Radford, D.C.; Khoo, T.L.; Ahmad, I.; Helppi, H.; Holzmann, R.; Janssens, R.V.F.; Driggert, M.; Garg, U. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

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The authors have employed two Compton-suppressed-spectrometers to measure the α spectra emitted at 0° and 90° by ^{153}Ho formed in the reaction 165 MeV ^{37}Cl + ^{120}Sn. By tagging on the decay of a 229 ns isomer in this nucleus it was possible to obtain spectra emitted by this and only this nucleus. The combination of Compton-suppression and selection of a single-channel with delayed coincidence tagging produces an impressively clean spectrum. The CSS's, each consisting of a Ge detector with a BGO shield, are prototypes of the larger system being constructed by the Notre Dame-Argonne collaboration. The virtue of using a CSS, as opposed to a NaI detector, is that all features of the spectrum, including sharp lines, can be distinguished in the same detector. These data, the feeding times, and other available information suggest that the γ-decay starts out with a fast collective E2 cascade and is then funnelled, in a small spin range (ΔI ~ 8), into the aligned-particle configurations of the yrast line through stats of similar character. The data suggests a definite paucity of collective excitations in the vicinity (≦ 2 Me) of the yrast line.

49334 (ANL—85-22, pp 85-87) **K X-ray yields, M1 strength and the γ-ray quasicontinuum in ^{153}Ho.** Janssenns, R.V.F.; Radford, D.C.; Ahmad, I.; van den Berg, A.M. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The study of M1 strength in quasicontinuum spectra of nuclei at the beginning of the rare earth region could provide important information on the nature of collective motion known to occur at high spin. With this in mind, the authors have performed measurements of K-shell ionization yields in ^{153}Ho, as a function of the incident beam energy, and thus also as a function of angular momentum. X-ray spectra from a small Ge detector, as well as γ-ray spectra from a large Ge detector and a 5" x 5" NaI(Tl) detector were recorded for the ^{120}Sn(^{37}Cl,4n) reaction at 6 beam energies between 150 and 175 MeV. At the lowest beam energies the measured x-ray multiplicity is essentially comparable with that calculated from the internal conversion of the known discrete lines. However, as more angular momentum is added to the system the increase in the measured x-ray multiplicity is found to be much larger than the one calculated. This result implies the presence of other highly converted transitions populated at spins in excess of 40 h. The present analysis provides evidence that low-energy M1 strength occurs at very high spin in ^{153}Ho. A substantial fraction of this strength is carried through very weak lines with E/sub γ/ ≦ 350 keV.

49335 (ANL—85-22, pp 88) **Study of high spin states in ^{155}Ho.** Radford, D.C.; Helppi, H.; Janssens, R.V.F.; Khoo, T.L.; Broda, R.; Daly, P.J.; Grabowski, Z.W.; McNeill, J. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

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Changes in the character of yrast levels are of particular interest since they are a sensitive test of our understanding of the interplay between collective and single-particle modes of excitation. To further extend the systematics of the transition the authors have chosen to study high-spin states in ^{155}Ho, an isotone of ^{154}Dy. The analysis of an angular distribution measurement and of a γ-γ coincidence experiment performed last year has continued but is rather difficult. This is due to the complexity of the decay scheme which translates into the occurrence of a large number of weak γ-rays difficult to place in a level scheme consistent with all the data. Nevertheless, preliminary results indicate a transition to an oblate shape at a spin in excess of 55/2 h. This shape change is probably responsible, at least in part, for the complexity of the γ-decay mentioned above.

49336 (ANL—85-22, pp 89-90) **Nature of the backbending in the Os-Ir-Pt region.** Garg, U.; Marshalek, E.R.; Chaudhury, A.; Funk, E.G.; Kaczarowski, R.; Mihelich, J.W.; Janssens, R.V.F.; Radford, D.C.; van den Berg, A.M. (Univ. of Notre Dame, South Bend, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The structure of ^{181}Ir was investigated towards higher spins through the measurement of γ-γ coincidences with the ^{150}Nd(^{35}Cl,4n) reaction. A backbending was observed in the h/sub 9/2/ 1/2⁻[541] band at a frequency h omega ~ 0.3 MeV with Δi/ sub x/ ~ 6.5 h. In contrast, only an upbend is measured near the same frequency in the core nucleus ^{180}Os. The nature of this backbend was explored in the framework of the cranked Hartree-Fock-Boguliubov approximation. Good agreement between the data and the calculations is obtained for ^{180}Os where the upbending is calculated to arise from the rotation-alignment of two i/sub 13/2/ neutrons. A similar upbend is predicted for the h/sub 9/2/ 1/2⁻[541] band in ^{181}Ir. Thus, the model cannot explain how the upbend in ^{180}Os mutates into a backbend in ^{181}Ir.

49337 (ANL—85-22, pp 91-92) **Recoil distance lifetime measurements in ^{194}Pt.** Garg, U.; Chaudhury, A.; Drigert, M.W.; Funk, E.G.; Mihelich, J.W.; Radford, D.C.; Holzmann, R.; Janssens, R.V.F.; Khoo, T.L.; Helppi, H. (Univ. of Notre Dame, South Bend, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The lifetimes of the levels in the yrast band of ^{194}Pt were measured with the ^{154}Sm(^{34}S,4n) reaction at 160 MeV using the ANL plunger apparatus in conjunction with the Sum spectrometer. The results from a preliminary analysis of the authors data clearly show that the B(E2) values indeed increase significantly over spins 2^+ to 10^+ as predicted by the mixing discussed above. The increase by a factor of almost 2.5 implies that the mixing is substantial. In addition, a decline of the B(E2) values beyond spin 10^+ is also observed. The latter result is intriguing and might be indicative of the onset of triaxiality. Extension of the measurements to the neighboring /sup 186,182/Pt isotopes are planned.

49338 (BNL-NCS—37975) **Neutron cross sections for ^{152}Gd and ^{153}Gd.** Holden, N.E. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 5p. (CONF-8605158—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86012708.

From Department of Energy nuclear data committee meeting; Germantown, MD, USA (1 May 1986).

Cross section data is tabulated for ^{152}Gd and ^{153}Gd. Resonance data is given for ^{152}Gd. Both reported and revised measurements are presented for cross sections and resonance parameters. Recommendations for further cross section and resonance research for these two isotopes are made. (DWL). 15 ref., 3 tabs.

49339 (CEA-CONF—8021) **Total photon absorption.** Carlos, P. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)). Jun 1985. 27p. (CONF-850634—5; DPh-N-S—2283). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750848.

From International school for intermediate energy nuclear physics; Veronna, Italy (20 Jun 1985).

The present discussion is limited to a presentation of the most recent total photonuclear absorption experiments performed with real photons at intermediate energy, and more precisely in the region of nucleon resonances. The main sources of real photons are briefly reviewed and the experimental procedures used for total photonuclear absorption cross section measurements. The main results obtained below 140 MeV photon energy as well as above 2 GeV are recalled. The experimental study of total photonuclear absorption in the nuclear resonance region (140 MeV<E<2 GeV) is still at its beginning and some results are presented.

49340 (INIS-BR—476, pp 37) **$K=0^+$ two-quasi-particles bands in ^{168}Er.** Chen, C.H.-T.; Lin, L.; Lee, S.Y.; Tsai, S.F. (Sao Paulo Univ., Brazil. Inst. de Fisica; Central Univ., Tayuan, China; Brookhaven National Lab., Upton, NY, USA; Tayuan Univ., China). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49341 (INIS-BR—476, pp 38) **Cylindrical S-barp-bar boson model for large deformed nuclei.** Chen, C.H.-T.; Arima, A. (Sao Paulo Univ., Brazil. Inst. de Fisica; Tokyo Univ., Japan). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49342 (INIS-BR—476, pp 19) **Spectroscopy of doubly odd deformed nuclei (sup(168, 170) Lu).** Kreiner, A.J.; Rao, M.N.; Seale, W.A.; Cybulska, E.W.; Pascholati, P.R.; Acquadro, J.C. (Comision Nacional de Energia Atomica, Buenos Aires, Argentina; Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49343 (OUP—86-08) **Reaction dependence in the γ-decay of highly excited rare earth nuclei.** Rekstad, J.; Atac, A.; Guttormsen, M.; Ramsoey, T.; Olsen, J.B.; Ingebretsen, F. (Oslo Univ. (Norway). Fysisk Inst.). Mar 1986. 15p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703243.

The γ-decay from states with low spin at high excitation energy has been studied using the (^{3}He,^{3}He)^{162}Dy and (^{3}He,^{4}He)^{162}Dy reactions. The γ-ray spectra obtained in the two reactions are almost identical and do not reveal any reaction dependence.

49344 **Direct laboratory determination of the ^{187}Re half-life.** Lindner, M.; Leich, D.A.; Borg, R.J.; Russ, G.P.; Bazan, J.M.; Simons, D.S.; Date, A.R. (Lawrence Livermore National Lab., CA, USA; National Bureau of Standards, Gaithersburg, MD, USA; British Geological Survey, London, UK). 320: No. 6059, 246-248(20 Mar 1986). Contract W-7405-ENG-48.

The authors report a half-life of (4.35 +- 0.13) x 10^{10} yr, for ^{187}Re based on the growth of ^{187}Os over a 4-yr period into a large source of osmium-free rhenium. Since this result agrees with the best geochemically determined values, no significant revision of the present galactic age limits based on the geochemical values is necessary. The agreement at the 5% level of the decay rates determined on laboratory and meteorite-age timescales places a tight constraint on cosmological models in which fundamental 'constants' are allowed to vary. In particular, the fine-structure constant, α, must have changed by less than one part in 10^8 over the past 4.5 x 10^9 yr.

6519 Nuclear Properties And Reactions, A=190-219, Theoretical

REFER ALSO TO CITATION(S) 49287, 49320, 49351

49345 (ANL—85-22, pp 49) **Quasi-elastic processes in Si-induced reactions on Pb and Ca.** Kolata, J.J.; Vojtech, R.; Kovar, D.G.; Rosner, G.; Rehm, K.E.; Stephans, G.S.F.; Lesko, K.T.; Vineyard, M.F. (Univ. of Notre Dame, IN). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The previous study of quasielastic processes (elastic and inelastic scattering and few-nucleon transfer) induced by ^{28}Si on targets of ^{40}Ca and ^{208}Pb was extended to new bombarding energies and additional projectile-target combinations. Measurements were performed for ^{28}Si + ^{208}Pb at E/sub Lab/ = 165 MeV to complement previouly obtained results at E/sub Lab/ = 225 MeV, and for ^{28}Si, ^{30}Si + ^{208}Pb and ^{30}Si + ^{208}Pb at E/sub Lab/ = 225 MeV to study the influence of Q-values and nuclear structure. In these measurements, performed with the split-pole magnetic spectrograph, energy resolutions of 400 keV were achieved allowing study of transitions to resolved states of the final nucleus. The ^{28}Si + ^{40}Ca data have been analyzed to extract elastic, inelastic, and transfer angular distributions. These seem to display neither very strong transfer cross sections, nor strong perturbations of the elastic and inelastic scattering by coupling to the ^{28}Si 2+ state. Detailed DWBA and CCBA calculations are in progress. The Si = Pb data taken this year are presently being analyzed.

49346 (ANL—85-22, pp 50-51) **Energy dependence of quasi-elastic heavy ion reactions.** Rehm, K.E.; van den Berg, A.; Kovar, D.G.; Kutschera, W.; Lee, L.L.; Rosner, G.; Stephans, G.S.F. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have measured the strength of different reaction channels for the system /sup 58,64/Ni + ^{208}Pb in the energy range 345-380 MeV, which is about 15-25% above the Coulomb barrier. The cross sections for one and two neutron transfer stay constant in this energy range while the integrated cross sections for charge transfer decrease with decreasing energy. In relation to the total reaction cross section which rapidly increases with energy, this implies that neutron transfer processes are increasingly more important at energies close to the barrier. The average Q-values for these channels are slightly negative.

49347 (ANL—85-22, pp 149-150) **^{16}O + ^{208}Pb near the Coulomb barrier.** Pieper, S.C.; Rhoades-Brown, M.; Landowne, S. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

There exists data for elastic, inelastic, transfer and fusion reactions of ^{16}O + ^{208}Pb at energies below and above the Coulomb barrier. The authors have attempted to describe all of this data using coupled-channels calculations with ad hoc form factors for the transfer channels and an incoming-wave boundary condition for the fusion channel. Because all of the flux lost from the elastic channel is thus explicitly accounted for, the authors need no imaginary optical potential. The real part of the optical potential and the form factors are energy independent. The authors find that they reproduce the elastic and fusion cross sections very well. The trends of the transfer cross sections are also predicted.

49348 (CEA-CONF—7946) **Some aspects of heavy ion physics between 20 and 50 MeV/u.** Ngo, C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Apr 1985. 25p. (CONF-8504198—4; DPh-N-S—2275). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750847.

From 9. course on nucleus-nucleus collisions from the Coulomb barrier up to the quark-gluon plasma; Erice, Italy (10 Apr 1985).

Heavy ions like Ar or Kr are now available at bombarding energies between approximately 20 and 50 MeV/u at GANIL or SARA. They can be used to investigate what happens when a heavy projectile interacts by nuclear forces with a heavy target. In these lectures we shall try to present some aspects of these results and see whether some general features emerge in this bombarding energy region. In the first lecture we shall summarize the results which have been obtained in the experiments where one looks at how much linear momentum the projectile can transfer to a fused system. In the second lecture we shall describe very recent results obtained with Kr projectiles. Finally, in the last part we shall investigate, from the theoretical point of view, whether nuclei could be mechanically unstable. This will be done in the framework of a time dependent Thomas Fermi approach. We shall see that compression, can be a cause of mechanical instability.

49349 **(DOE/ER/40048—162) Heavy ion fusion and fission reactions.** Vandenbosch, R. (Washington Univ., Seattle (USA). Nuclear Physics Lab.). 1986. Contract AC06-81ER40048. 24p. (CONF-8605150—2). NTIS, PC A02/MF A01. File Number DE86013147.

From Beijing symposium on physics at tandem; Beijing, China (26 May 1986).

Various methods of probing the partial wave distribution are reviewed and new results using fission fragment angular distributions are discussed. Evidence that existing models of fusion reactions near-barrier and sub-barrier energies underestimate the mean-square spin values are presented. The dynamics of fusion reactions at higher energies are also discussed. The controversy over the interpretation of fission fragment and angular distributions are reviewed. Both statistical scission models and dynamical models with incomplete K mixing are discussed. New developments related to the effective moment of inertia of the saddlepoint shape are presented.

49350 (INIS-BR—476, pp 3-4) **Attenuation method for σ sub(R) measurements in heavy ion systems.** Villari, A.C.C.; Lepine-Szily, A.; Lichtenthaler Filho, R.; Portezan Filho, O.; Rotberg, V.H.; Fernandes, M.A.G. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49351 (INIS-mf—9759, pp 319-324) **High-spin states in ^{200,201}Po and systematical features of Po isotopes.** Fant, B.; Weckstroem, T.; Herrlander, C.J.; Kaellberg, A.; Loennroth, T.; Rahkonen, V. (Helsinki Univ., Finland. Dept. of Physics; Research Institute of Physics, Stockholm, Sweden; Jyvaeskylae Univ., Finland. Dept. of Physics). 1984. NTIS (US Sales Only), PC A20/MF A01. File Number DE85781595. (CONF-8403127—).

From 5. Nordic meeting on nuclear physics; Jyvaskyla, Finland (12 Mar 1984).

The present work focusses attention on excited high-spin states in ^{200,201}Po, with emphasis on the questions - are there collective effects in these nuclei or can they still be depicted as 'shell-model nuclei'.

49352 **(INIS-mf—10200) Neutron emission in heavy ion reactions as measure for the excitation energy and the transfer of linear momentum - experiments with a 4π-scintillator tank.** Ingold, G. (Freie Univ. Berlin (Germany, F.R.). Fachbereich Physik). 15 Mar 1985. 119p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE86752603.

In the present thesis the measurement parameter 'neutrons multiplicity' is introduced for experiments with heavy ions by a 4π scintillator tank for the first time inclusive multiplicity distributions were measured in coincidence with projectile-like fragments, with light charged particles, and with heavy reaction products from fusion-like processes for ^{20}Ne+^{197}Au and ^{20}Ne+^{238}U at 220 MeV, 290 MeV, and 400 MeV. The inclusive spectra show a characteristic partition for the neutron emission from peripheral and central collision. For the peripheral collisions the components for the transfer and the projectile break-up in the projectile-like spectra can be discriminated. For the more central collisions a new method for the determination of the mean linear momentum transfer is presented. From the inelastic scattering to the complete fusion to each neutron number an impact-parameter range can be assigned. A strong correlation is observed between the mass transferred from the projectile to the target, the momentum, and the energy transfer. With increasing incident energy the mean momentum transfer becomes more incomplete. For the missing momentum transfer preequilibrium particles are responsible the contribution of which in the neutron number spectra for the light evaporated particles can be well separated from the break-up respectively evaporation component. Angular distributions of fission fragments could by this be measured for the first time in dependence on the linear momentum transfer. The slope of the anisotropy also indicates a strong correlation between the momentum and angular momentum transfer. The latter shows a saturation at high spins. The determination of effective moments of inertia of the fissioning nuclei and their comparison with the predictions of the model of a rotating liquid drop becomes possible for differentially posed spin windows.

49353 **(LBL—21580) Transfer and breakup reactions at intermediate energies.** Stokstad, R.G. (Lawrence Berkeley Lab., CA (USA). Nuclear Science Div.). Apr 1986. Contract AC03-76SF00098. 28p. (CONF-8604165—8). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86013199.

From International conference on heavy ion physics; Rochester, NY, USA (21 Apr 1986).

The origin of the quasi-elastic peak in peripheral heavy-ion reactions is discussed in terms of inelastic scattering and transfer reactions to unbound states of the primary projectile-like fragment. The situation is analogous to the use of reverse kinematics in fusion reactions, a technique in which the object of study is moving with nearly the beam velocity. It appears that several important features of the quasi-elastic peak may be explained by this approach. Projectile-breakup reactions have attractive features for the study of nuclear structure. They may also be used to determine the partition of excitation energy in peripheral reactions. At intermediate energies, neutron-pickup reactions leading to four-body final states become important. Examples of experiments are presented that illustrate these points. 15 refs., 14 figs.

49354 **/sup 208/Pb+n reaction and the mean nuclear field near threshold.** Horen, D.J.; Johnson, C.H.; Fowler, J.L.; MacKellar, A.D.; Castel, B. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **34**: No. 2, 429-442(Aug 1986). Contract AC05-84OR21400.

Measurement of the total and differential elastic cross sections for the /sup 208/Pb+n reaction are reported for the neutron energy range E-italic = 50—1005 keV. The data have been analyzed in terms of partial waves using the R-italic-matrix formalism. The results were used to deduce optical model potentials near threshold. When the real part is expressed solely in terms of an "effective" volume and surface spin-orbit components, it is found that the depth of the "effective" volume potential exhibits an l-italicJ-italic dependence. It is noted that because of differences in the continuum wave functions in the surface region, such an effect could arise if the actual potential contained a real surface term. Relevance to the "Fermi surface anomaly" is mentioned. The observed reduced neutron strengths are compared with predictions from three microscopic models and good agreement is found.

49355 **Expanding pion emitting source in Ar on Pb collisions.** Beavis, D.; Chu, S.Y.; Fung, S.Y.; Keane, D.; Liu, Y.M.; VanDalen, G.; Vient, M. (Department of Physics, University of California, Riverside, California 92521). **34**: No. 2, 757-760(Aug 1986).

We report results of a pion interferometry analysis for central collisions of 1.8 GeV/nucleon Ar on Pb at the Bevalac streamer chamber. The statistics are sufficient to allow a detailed study of the spatial structure of the pion emitting source. The dependence of the size of the source on the average magnitude of the momenta of the emitted pion pairs is consistent with the picture of an expanding

pion source. There are also indications that the Ar nucleus is completely stopped by the Pb target in the most central collisions.

49356 **Giant resonance structure in /sup 208/Pb measured using the (p,p/sup '/) reaction at 334 MeV.** Bertrand, F.E.; Gross, E.E.; Horen, D.J.; Sayer, R.O.; Sjoreen, T.P.; McDaniels, D.K.; Lisantti, J.; Tinsley, J.R.; Swenson, L.W.; McClelland, J.B. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **34**: No. 1, 45-59(Jul 1986). Contract AC05-84OR21400.

The structure of giant resonances in /sup 208/Pb has been studied using inelastic scattering of 334-MeV polarized protons. Data were obtained with 70-keV energy resolution over an angular range from 2—13 deg and the spectra were measured over an excitation energy range from 0—25 MeV. The results show that the quadrupole resonance strength is divided into two main components, one centered at 10.6 MeV containing 70% of the energy-weighted sum rule in a 2-MeV wide peak and a second component composed of several discrete peaks located between 7 and 9 MeV which deplete a total of approximately 20% of the energy-weighted sum rule. The giant monopole and dipole resonances as well as a hexadecapole resonance are observed. Measurements of differential cross sections for elastic scattering and inelastic scattering to low-lying 3^-, 2^+, and 4^+ levels are presented. Comparison of these data with collective model direct reaction calculations shows the calculations to correctly describe the shape and magnitude of the cross sections when normalized to the known transition rates for each level.

49357 **/sup 218/Ra α reduced width and its consequences for α clustering in the heavy elements.** Toth, K.S.; Kim, H.J.; Rao, M.N.; Mlekodaj, R.L. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **56**: No. 22, 2360-2363(2 Jun 1986). Contract AC05-84OR21400;AC05-76OR00033.

Nuclei of /sup 218/Ra were produced in the reaction /sup 208/Pb(/sup 13/C,3n-italic). After being separated from the beam by a velocity filter, they were implanted in a Si(Au) surface-barrier detector and their α-particle decays were observed in the same detector. From these α-decay events the half-life of /sup 218/Ra was measured to be 25.6 +- 1.1 μs, almost a factor of 2 greater than the previously reported value of 14 +- 2 μs. The resultant α width fits well into the overall picture of α-decay-rate systematics and weakens one piece of evidence quoted for the existence of α clusters in heavy elements.

6520 Nuclear Properties And Reactions, A=220 And Above, Theoretical

49358 (ANL—85-22, pp 39) **Beta spectra following the spontaneous fission of ^{252}Cf.** Wark, D.; Garvey, G.; Boehm, F.; Camp, J. (California Institute of Technology, Pasadena). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Neutrino-oscillation studies using reactor sources can be made much more sensitive if the nu spectrum from the reactor is known. The fission of a heavy nucleus such as Cf or U creates neutron-rich nuclei so far from the valley of stability that their beta-decay spectra are not known. Thus a model must be employed to predict the overall beta-decay spectrum and the attendant nu spectrum. In order to test the reliability of the procedure in use the beta spectrum of the fission fragments following ^{252}Cf fission is being measured to an accuracy of 3% in shape and 5% in total yield. An actively-collimated, flat-field beta spectrometer is used.

49359 (ANL—85-22, pp 101-103) **Spontaneous emission of ^{14}C from ^{223}Ra.** Kutschera, W.; Ahmad, I.; Armatto, S.G. III; Friedman, A.M.; Gindler, J.E.; Henning, W.; Ishii, T.; Paul, M.; Rehm, K.E. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Rose and Jones recently discovered in an ingeniously simple experiment that ^{223}Ra, an α emitter with a half-life of 11.4 days, occasionally emits ^{14}C nuclei of 29.8 MeV energy. The branching ratio relative to α decay was measured to be (8.5 +/- 2.5) x 10^{-10}. ^{223}Ra occurs in the natural decay chain of ^{235}U, with ^{227}Ac being a convenient precursor and source material. In the present study the authors have confirmed the spontaneous emission of ^{14}C from ^{223}Ra and unambiguously identified the mass of the emitted particles.

49360 **(DOE/ER/40165—1) Measurement of the fission cross section of ^{238}Pu.** Alam, B.; Block, R.C.; Slovacek, R.E.; Hoff, R.W. (Rensselaer Polytechnic Inst., Troy, NY (USA). Gaerttner LINAC Lab.; Knolls Atomic Power Lab., Schenectady, NY (USA); Lawrence Livermore National Lab., CA (USA)). 1986. Contract FG02-84ER40165. 6p. (CONF-860906—6). NTIS, PC A02/MF A01; GPO Dep. File Number DE86007603.

From Advances in reactor physics and safety meeting; Saratoga Springs, NY, USA (17 Sep 1986).

A measurement of the neutron-induced fission cross section of ^{238}Pu from 0.1 eV through 100 keV is described. The technique employed was to use the large neutron flux from the Rensselaer Intense Neutron Spectrometer to obtain an adequate ratio of the neutron-induced fission signal to the spontaneous fission background signal. A special fission chamber design employing multiple pairs of hemispherical electrodes coupled with fast electronics combine to suppress the alpha pile-up effects. The counting data were corrected for dead time losses, spontaneous fission background and flux shape variations. The corrected ^{238}Pu data were then normalized with the resolution-broadened ^{238}Pu ENDF/B-V library cross-section at the peaks of the 9.6 eV and 18.3 eV resonances.

49361 **(DOE/ER/40165—4) Fission cross section measurement of ^{242}Cm and ^{243}Pu. Final report, June 1, 1984-June 30, 1986.** Block, R.C. (Rensselaer Polytechnic Inst., Troy, NY (USA)). Jul 1986. Contract FG02-84ER40165. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86013663.

The neutron fission cross sections of microgram quantities of Cm-242 and Pu-238 have been measured at the RPI Gaerttner LINAC Laboratory with the Rensselaer Intense Neutron Spectrometer (RINS) system over the energy range from 0.1 eV to 100 keV. A fission chamber with hemispherical electrodes was constructed for these measurements which, along with high-speed electronics, enabled fission signals to be clearly separated from alpha pileup signals. 2 refs., 1 fig.

49362 **(INIS-mf—10410) Decay of the giant monopole resonance in heavy nuclei.** Brandenburg, S. (Rijksuniversiteit Groningen (Netherlands)). 30 Aug 1985. 107p. NTIS (US Sales Only), PC A06/MF A01. File Number DE86703152.

In this thesis an experimental study of the properties of the giant monopole resonance (GMR) in nuclei is described. The main subject is the study of the neutron decay of the GMR in ^{208}Pb, and the fission decay of the GMR in ^{238}U. Furthermore the strength distribution and decay properties of the monopole strength in ^{24}Mg and ^{40}Ca were studied. The strength distribution of the isoscalar monopole (and also of the isoscalar dipole) strength as obtained from the angular distribution of the excited strength at small scattering angles are discussed. For the excitation of the GMR inelastic scattering at very small scattering angles, including 0°, of 120 MeV α-particles was employed. The experimental technique for performing this type of measurement at the KVI was developed in the course of this study and is the subject of a separate chapter. Includes Dutch summary; 310 refs.; 55 figs.; 9 tabs.

49363 **(NEANDC(J)—121/U) Evaluation of neutron nuclear data for ^{250}Cf and ^{251}Cf.** Nakagawa, Tsueno. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Jun 1986. 35p. (JAERI-M—86-086; INDC(JPN)—107/L). Japan Atomic Energy Research Institute, Dept. of Technical Information, Tokaimura, NaKagun, Japan. File Number TI86901539.

Nuclear data of ^{250}Cf and ^{251}Cf have been evaluated in the energy range from 10^{-5} eV to 20 MeV. There exist only a few experimental data for the cross sections of both the isotopes, that is, the cross sections at the thermal neutron energy and the resonance

integrals. Therefore, the present evaluation was based on systematic trends of the data and the claculations with the optical, statistical and evaporation models. Cross sections evaluated in this work are the total, elastic and inelastic scattering, fission, radiative capture, (n,2n), (n,3n) and (n,4n) reaction cross sections. In the energy range below 150 eV, hypothetical resonance levels were generated so as to reproduce the measured thermal cross sections and resonance integrals. Other evaluated quantities are the angular distributions of elastically and inelastically scattered neutrons and those of neutrons emitted from the (n,2n), (n,3n), (n,4n) and fission reactions, their energy distributions, and average numbers of neutrons emitted per fission. The results were compiled in the ENDF/B-V format. 28 refs., 16 figs., 1 tab.

49364 **(NFL—42) Yields of products from thermal-neutron induced fission of ^{235}U.** Rudstam, G.; Aagaard, P.; Zwicky, H.U. (Studsvik Science Research Lab., Nykoeping (Sweden)). 1985. 146p. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703244.

Methods for fission yield determinations at an ISOL-system connected to a nuclear reactor have been developed. The present report contains detailed descriptions both of the experimental techniques and of the method used to correct the experimental yields for the decay of short-lived nuclear species in the delay between production and measurement. The methods have been applied to the determination of the fission yields of 40 fission products including 2 isometric pairs in the light mass region and those of 99 fission products including 25 isometric pairs or triplets in the heavy mass region. For 64 cases this is the first determination published. With 113 refs.

49365 **Fragment angular distributions for neutron fission of /sup 232/Th.** Becker, J.A.; Bauer, R.W. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). **34**: No. 2, 594-600(Aug 1986). Contract W-7405-ENG-48.

Fission fragment angular distributions were measured for the neutron-induced fission of /sup 232/Th at incident energies from threshold to 6 MeV, using a white source of neutrons, time-of-flight techniques, and position-sensitive multiwire counters subtending a solid angle of nearly 2π sr. The experimental data were analyzed in incident neutron energy bins of 40 keV and angular bins of 9 deg, and compared with previous results which were available for only partial energy ranges covered by this experiment. A channel analysis yielded relative strengths for the K-italic transition states with K-italic = (1/2), (3/2), and (5/2) from threshold to E-italic/sub n/ = 4.5 MeV.

49366 **Multilevel analysis of the low-energy ^{239}Pu cross sections.** Perez, R.B.; deSaussure, G.; Larson, N.M.; Macklin, R.L. (Oak Ridge National Lab., P.O. Box X, Oak Ridge, TN 37831). **93**: No. 1, 31-42(May 1986). Contract AC05-84OR21400;FG05-85ER40188.

Several sets of ^{239}Pu neutron cross-section data have been analyzed with the R-matrix Bayesian program SAMMY up to 30 eV. The cross sections computed with the multilevel parameters are consistent with recent fission and transmission measurements, as well as with older capture and alpha measurements. The Reich-Moore-type-R-matrix resonance parameters were converted into equivalent Adler-Adler-type parameters using the computer program POLLA.

49367 **Subthreshold fission cross section of ^{240}Pu and the fission cross sections of ^{235}U and ^{239}Pu.** Weston, L.W.; Todd, J.H. (Oak Ridge National Lab., TN). **88**: 567-578(1984).

The subthreshold fission cross section of 240 Pu was measured relative to the ^{10}B(n,α) or the ^{6}Li(n,α) cross sections from 20 eV to 100 keV. Resonance parameter fits to the data were derived from 20 to 5700 eV. Many more resonances and more resonance structure were observed than in previous measurements. During the course of this measurement, the fission cross sections of ^{235}U and ^{239}Pu were also measured and are compared to the ENDF/B-V evaluation. The ^{235}U experiment is in good agreement with ENDF/B-V; however, the ^{239}Pu measurement is lower than ENDF/B-V and many of the previous measurements, particularly above 25 KeV. 16 references, 12 figures, 8 tables.

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REFER ALSO TO CITATION(S) 49171, 49188

49368 **(AD-A—167490/2/XAB) Hartree-Fock theory in nuclear physics. Technical summary report.** Goyny, D.; Lions, P.L. (Wisconsin Univ., Madison (USA). Mathematics Research Center). Feb 1986. 75p. (MRC-TSR—2914). NTIS, PC A04/MF A01.

This document investigates the so-called Hartree-Fock theory arising in the study of the structure of nuclei. The Hartree-Fock theory is an approximation method of many-body problems modelling the interaction of nucleons (neutrons and protrons), which lead to nonlinear variational systems of elliptic equations (the Hartree-Fock equations). These equations pertain to questions related to spin dependence and spin-orbit forces, symmetries of the nucleus and symmetry breakings, and time-dependent Hartree-Fock equations. One of the main features of these problems is the translation invariance, which creates compactness difficulties that are overcome by the use of the concentration-compactness method.

49369 (ANL—85-22, pp 121-122) **Relativistic nucleon-nucleon potentials.** Lee, T.S.H.; Wiringa, R.B. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A method for fitting relativistic nucleon-nucleon (NN) potentials to phase-shift data has been developed and is being used to construct a relativistic version of the Argonne v_{14} potential. This has been achieved by combining existing momentum-space (MS) and configuration-space (CS) computer codes for NN scattering. The MS code is required to solve the relativistic Schroedinger equation, while the CS code is much more efficient in searching for potential parameters to fit the data.

49370 (ANL—85-22, pp 126-127) **Coupled cluster and variational calculations of nuclear matter.** Day, B.D.; Wiringa, R.B. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Coupled-cluster and variational calculations of nuclear matter have been performed for the Argonne v_{14} potential. This potential can be written as the sum of central, isospin, spin, tensor, L.S, L^2, and $(L.S)^2$ operators, and gives a good fit to NN scattering data. The most realistic potential for which both methods had previously been used is the L-independent v_8 model of the Reid soft-core potential. The solution of the coupled-cluster equations, including both two- and three-body correlations, requires as input the matrix elements of the two-body potential in momentum space. Until now, this has restricted use of the method to potentials that can be analytically transformed to momentum space. The authors have now developed a satisfactorily fast and accurate numerical method for transforming coordinate-space potentials, such as Argonne v_{14}, to momentum space. This enlarges the class of NN potentials for which the coupled-cluster equations can be solved.

49371 (ANL—85-22, pp 128) **Further calculations of meson excess in nuclei.** Wiringa, R.B. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Calculations of pion excess in nuclei by Friman, Pandharipande and Wiringa (FRP) reported last year have been extended to study several interesting points. The pion excess results from the presence in a nucleus of an enhanced (over the nucleon's own pion cloud) pion number due to the long-range attractive pion exchange interactions. This pion excess can be calculated by taking expectation values with nuclear matter wave functions of an appropriate number operator. The pion excess for large nuclei is then estimated by using a local density approximation, and the resulting excess pion number densities, n/sub π/(k), have been used as model input

for the study of deep-inelastic lepton scattering (the EMC effect) described elsewhere.

49372 (ANL—85-22, pp 129-130) **Nuclear effects in deep-inelastic lepton scattering.** Berger, E.L.; Coester, F. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In the interpretation of deep-inelastic lepton scattering it was, until recently, taken for granted that the momentum distribution of the quarks in the nucleons are not affected by the nuclear medium, and that nucleons are the only relevant constituents of nuclei. The authors have been investigating in detail models based on the assumptions that quarks are always confined to individual hadrons and that nuclei are multi-hadron bound states. Such models, in which the role of quantum chromodynamics is confined to the description of the structure of single hadrons, are natural extensions of successful nuclear theory.

49373 (ANL—85-22, pp 131) **Quark models of hadron interactions.** Coester, F.; Polyzou, W.N. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

Quark models of single hadrons have been successful in accounting for hadron spectroscopy. They are not automatically applicable to multi-hadron dynamics. The authors are investigating quark models of multi-hadron dynamics which emphasize the following features: (1) spatial confinement of quarks is tied to color confinement (gauge invariance), (2) absence of long-range Van der Waals forces, (3) Poincare invariance. Starting from ideas due to Greenberg and Hietarinta the authors realize these requirements in zeroth order by models which feature quarks confined to noninteracting hadrons, each of which has infinitely many stable excited states. The authors have investigated in detail the mathematical properties of models consisting of quark-antiquark systems coupled to two-quark-two-antiquark states, and developed a particular implementation suitable for numerical studies. Preliminary results are encouraging.

49374 (ANL—85-22, pp 134-135) **Meson-exchange Hamiltonian for N, π, Δ and N*(1470 MeV) isobars.** Lee, T.S.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The main feature of intermediate energy nuclear reactions induced by pions, nucleons and electrons is the production or absorption of on-mass-shell pions through the excitation of the Δ and higher mass nucleon resonances. In order to develop a many-body approach to the problem, the authors have been constructing a model Hamiltonian for π, N, Δ and N*(1470). This is done by carrying out an extensive study of NN scattering up to 2 GeV and πd scattering up to about 400 MeV. The authors are investigating a meson-exchange model based on the following mechanisms: (a) vertex interactions for $\pi N \rightleftharpoons \Delta$ or N*, $\pi\Delta \rightleftharpoons \Delta$ or N* are determined from πN scattering up to 1 GeV, (b) transition interactions between NN to NΔ, $\Delta\Delta$, NN* and N*N* are determined by the one-pion and one-rho exchange, (c) NN $\rightarrow$ NN interaction is derived from the Paris potential.

49375 (ANL—85-22, pp 135-136) **Theory of mesonic and dibaryonic excitation in the πNN system.** Lee, T.S.H.; Matsuyama, A. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have extended their meson-exchange Hamiltonian for π,N and Δ to include a vertex interaction BB $\rightleftharpoons$ D, where D is a dibaryon state with its mass and quantum numbers predicted by the Bag model. To investigate the influence of this dibaryon state on NN and πd scattering, the authors first have developed a scattering formalism in which the coupling of the dibaryon state D to the meson-exchange processes is treated exactly within the constraints imposed by the 2- and 3-body unitarity relations. In the same derivation, the authors also include the nonresonant meson production process which is also known to play an important role in describing the NN and πd spin observables. A paper describing this unitary formulation of the problem is being prepared for publication. In a first calculation, they have explored the effect of the 2^+ dibaryon state predicted by the MIT Bag model on the NN and πd scattering.

49376 (ANL—85-22, pp 140) **Microscopic study of D-nucleus dynamics.** Lee, T.S.H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The purpose of this work is to explore the dynamical origin of the Δ-nucleus interaction which has been treated phenomenologically in the study of intermediate energy pion nucleus scattering. In the one-hole-line approximation the Δ-nucleus potential can be calculated from the NΔ G matrix by imposing the Brueckner-Hartree-Fock self-consistent condition. The authors first calculation was done in 1982, by using the separable model Hamiltonian of Betz and Lee. Extensive calculations with their newly developed meson-exchange theory have been performed recently. It is found that the calculated absorptive part of the Δ-nucleus potential is much less than the phenomenological value, ranging from only 20% (from the Bonn potential) to about 60% (from the Paris potential) of phenomenological values. These results suggest that more than one nucleon in a nuclear medium are active in annihilating the incoming pion.

49377 (ANL—85-22, pp 140-141) **Electromagnetic interaction with nuclei at energy above the pion production threshold.** Lee, T.S.H.; Ohta, K. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The starting point in this study is to develop a systematic theoretical method to include the electromagnetic interaction in a nuclear theory with π, N and Δ degrees of freedom. The method is to assume that the nuclear many-body Hamiltonian can be deduced from a relativistic quantum field theory by a three-dimensional reduction. In order to study high-energy and high-momentum transfer processes, one does not make the conventional ($1/c^2$) nonrelativistic expansion in constructing current operators. The method has been applied to construct a model of the one-body current for the $\gamma N \rightarrow N$ and $\gamma N \rightleftharpoons \Delta$ transitions.

49378 (ANL—85-22, pp 141-142) **Study of weak neutral-current effects in (e,e'X) reactions.** Kleppinger, W.E. Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

In electron scattering from nuclei, in addition to the usual electromagnetic interaction, unified models of the electromagnetic and weak interactions predict an additional weak neutral-current interaction. When this additional interaction is included, a parity-violating contribution to the cross section due to the interference of the electromagnetic and neutral-weak currents, is present. The purpose of this work was to examine how these effects can be explored in (e,e'X) reactions with polarized incident electrons, where in addition to detecting the scattered electron, a decay particle X, emitted by the excited target nucleus, is also detected. It is found that new interference terms appear in the cross section that are not present in inelastic (e,e') scattering. A model calculation that assumed that the target was excited to a single, intermediate resonance indicates that the angular distribution of X is sensitive to these new terms. Results of this work have been published.

49379 (ANL—85-22, pp 143) **Calculation of Landau parameters of Δ-h interaction.** Lee, T.S.H.; Ohta, K.; Sagawa, H. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

By applying meson-exchange Hamiltonian for π, N, and Δ, the authors have carried out a Bruckner G matrix calculation for

the coupled NN and NΔ interaction in nuclear matter. The calculated G matrix for NN ⇌ NΔ transition is used to calculate the effect of Δ-hole coupling on the Landau parameters. The results show that the NΔ interaction in p-waves plays the most important role which clearly shows the importance of the use of a model Hamiltonian which can describe the NN ⇌ NΔ transition in each partial wave. This approach is therefore more realistic than all previous work since this model Hamiltonian can describe the NN phase shifts in the regions where the inelastic process NN → NΔ → NNπ takes place. These results disagree with the calculation by Arima and Schimizu who used the simple-one-pion and one-rho exchange.

49380 (ANL—85-22, pp 151-153) **Pair-distribution function and energy-density functionals for ^{4}He droplets.** Pieper, S.C.; Wiringa, R.B.; Pandharipande, V.R. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

A detailed study of pair distributions in droplets containing 8 to 240 ^{4}He atoms has been made, and the results used to test the validity of the local density approximation and construct energy-density functionals. The pair-distribution function in a droplet can, in general, depend on the positions of both atoms, their separation, and the number of atoms in the droplet (a total of four non-trivial variables).

49381 (ANL—85-22, pp 153-154) **Excited states of atomic ^{4}He droplets.** Wiringa, R.B.; Pieper, S.C.; Pandharipande, V.R. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

The authors have made microscopic calculations of the excited-state energies and transition densities of droplets containing 20-240 atoms using the random walk tapes. The excited-state wave function is taken as a sum of single-particle excitation operators acting on the variational ground state. The operators include two or three variational parameters and are constructed with the appropriate angular momentum and parity of the excitation. The excited state energy is computed in the Feynman-Cohen approximation, which would be exact if the authors had the exact ground state. Although the authors variationally-determined ground state is not the true ground state, the Feynman-Cohen approximation is believed to give a good measure of the energy required for one quantum of excitation.

49382 (ANL—85-22, pp 154-155) **Variational Monte-Carlo calculations of ^{3}He droplets.** Pieper, S.C.; Wiringa, R.B.; Pandharipande, V.R. (Argonne National Lab., IL). Sep 1985. NTIS, PC A13/MF A01. File Number DE86002650.

In Physics Division annual review, 1 April 1984-31 March 1985.

During 1984 the Feynman-Cohen backflow correlation was included in the authors variational Monte Carlo program for Fermion droplets. With this correlation every element of the Slater determinant is changed when just one atom is moved. This makes the evaluation of the modified wavefunction and of the kinetic energy much more time-consuming. The authors attempted to reduce the computational requirements by omitting the backflow from the random walk and by using the simpler Clark-Westhaus form for the backflow kinetic energy; in both cases the resulting increase in the variance was unacceptably large. Therefore this program now controls the random walk with the backflow correlation and uses the Pandharipande-Bethe kinetic energy.

49383 (CEA-CONF—7913) **Analysing powers in free n vector p forward elastic scattering at energies from 650 to 1000 MeV.** Korolev, G.A.; Khanzadeev, A.V.; Petrov, G.E.; Spiridenkov, E.M.; Vorokyov, A.A.; Terrien, Y.; Lugol, J.C.; Saudinos, J.; Silverman, B.H.; Wellers, F. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Aug 1985. 3p. (CONF-850807—13; DPh-N—2268). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750876.

From 6. international symposium on polarization phenomena in nuclear physics; Osaka, Japan (26 Aug 1985).

Published in summary form only.

49384 (CONF-8505189—5) **Pair production at GeV/u energies.** Bottcher, C.; Strayer, M.R. (Oak Ridge National Lab., TN (USA). Physics Div.). 1985. Contract AC05-84OR21400. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86008986.

From Atomic theory workshop on relativistic and QED effects in heavy atoms; Gaithersburg, MD, USA (23 May 1985).

Electron and positron production in relativistic ion-atom collisions is discussed within the context of the time-dependent Dirac-Hartree approximation to a fully relativistic field theory of the collision. The time-dependent fields are treated classically, and the numerical methods employing basis splines are discussed in detail and contrasted with results obtained from the case of non-relativistic velocities. The results of a one-dimensional model are presented and show a moderately large probability for pair production followed by electron capture. 8 refs., 16 figs.

49385 (CONF-8606183—1) **Possibility of new particle production in heavy-ion collisions.** Balantekin, A.B. (Oak Ridge National Lab., TN (USA). Physics Div.). 1986. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014220.

From NATO international advanced course on physics of strong fields; Maratea, Italy (1 Jun 1986).

Two-body decay of a particle is hypothesized in order to explain the lack of strong Z dependence of positron emission spectra in low-energy heavy ion collisions. The consequences of such a hypothesis are discussed, as well as recent theoretical and experimental work motivated by it. 50 refs. (LEW)

49386 (CONF-8606183—2) **μ- and tau-pair production from relativistic heavy-ion collisions.** Bottcher, C.; Strayer, M.R. (Oak Ridge National Lab., TN (USA). Physics Div.). 1986. Contract AC05-84OR21400. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014221.

From NATO international advanced course on physics of strong fields; Maratea, Italy (1 Jun 1986).

The question is addressed of μ- and tau-pair production from the motional Coulomb fields available at the new relativistic heavy-ion accelerators. A semiclassical field theory is developed which is appropriate for families of leptons which are coupled electromagnetically. The field equations are mapped on to a lattice of collocation points using basis spline methods, and techniques for solving the resulting lattice equations are outlined. The properties of the transverse electromagnetic field near the heavy-ion beam are examined and physical arguments are given as to the feasibility of pair creation under a variety of circumstances. Using the Dirac-Hartree equations developed in part one, we shall dynamically evolve the vacuum, using the appropriate fields, and compute μ-pair and tau-pair production cross sections. 16 refs., 10 figs.

49387 (DOE/ER/02853—29) **Non-mesonic decay of hypernuclei.** Dubach, J. (Massachusetts Univ., Amherst (USA)). 1986. Contract AC02-76ER02853. 7p. (CONF-860575—18). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013356.

From 2. conference on particle and nuclear physics; Lake Louise, Canada (26 May 1986).

The ΛN → NN non-mesonic decay mode of hypernuclei is examined in a model that employs a weak, strangeness-changing meson exchange potential in a Fermi gas model of the hypernucleus. Results are in good agreement with recent experiments for A = 11 and A = 12 hypernuclei. The calculations suggest that the ratio of proton-stimulated to neutron-stimulated decays and the ratio of parity-violating to parity-conserving decays are particularly sensitive to the details of the model. Finally, preliminary results using a more sophisticated shell model of the hypernucleus are discussed. 13 refs., 2 tabs.

49388 **(DOE/ER/02853—30) Theoretical aspects of the weak decay of hypernuclei.** Dubach, J. (Massachusetts Univ., Amherst (USA). Dept. of Physics and Astronomy). 1986. Contract AC02-76ER02853. 9p. (CONF-860741—8). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013355.

From International symposium on weak and electromagnetic interactions in nuclei; Heidelberg, F.R. Germany (1 Jul 1986).

The present status of theoretical descriptions of mesonic ($\Lambda \rightarrow N\pi$) and non-mesonic ($\Lambda N \rightarrow NN$) decay modes of hypernuclei is reviewed. Calculations for the non-mesonic mode are discussed in some detail within the context of a model which describes the strangeness-changing, parity-violating, $\Lambda N \rightarrow NN$ "transition potential" in terms of π, rho, ω, eta, K, K*, and "σ" exchanges. Results are presented for the total decay rate, the ratio of proton- to neutron-stimulated decay rates, and the as yet unmeasured ratio of parity-violating to parity-conserving decay rates. Calculations for nuclear matter, which are in reasonable agreement with experiment, suggest that these rates (particularly the two ratios) can provide important tests of the form of the transition potential. Considerations of finite hypernuclei are also discussed. Finally, other theoretical approaches and the present experimental situation are briefly summarized. 17 refs., 3 figs., 3 tabs.

49389 **(DOE/ER/13001—18) Research in theoretical nuclear physics. Annual progress report No. 18.** (State Univ. of New York, Stony Brook (USA). Dept. of Physics). 1986. Contract AC02-76ER13001. 11p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014254.

Research programs in four major areas are described: the structure of the nucleon and the nucleon-nucleon interaction, strangeness, and strange baryons; the equation of state of dense matter with specific concern both for the problems of stellar collapse and supernova explosions and of relativistic heavy-ion collisions, nuclear structure physics; and relativistic effects in nuclear particularly heavy ion reactions and quark matter physics. New research efforts in many-body theory are also described.

49390 **(DOE/ER/40068—1) Intermediate/high-energy reactions and the quark structure of nuclei. Technical progress report.** (Iowa State Univ. of Science and Technology, Ames (USA)). 1986. Contract AC02-82ER40068. 25p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014311.

During this past year a quark cluster model of nuclei has been improved and additional experimental signatures proposed that will distinguish it from other models which also successfully explain the EMC effect. In addition, an initial investigation has been completed of the statistical mechanical properties of finite nuclei within the finite temperature Hartree-Fock approximation using realistic microscopic effective Hamiltonians. Development of a new microscopic non-perturbative calculational scheme for QCD in light-cone coordinates is proposed that will eventually provide a practical framework to evaluate the quark and gluon structure of nuclei.

49391 **(IFUSP-P—518) Symmetries of the vacuum.** Fleming, H. (Sao Paulo Univ. (Brazil). Inst. de Fisica). 1985. 16p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703111.

The vacuum equation of state required by cosmological inflation is taken seriously as a general property of the cosmological vacuum. This correctly restricts the class of theories which admit inflation. A model of such a vacuum is presented that leads naturally to the cosmological principle.

49392 (INIS-BR—476, pp 29) **Semi-classical treatment of absorption.** Hussein, M.S.; Pato, M.P. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49393 (INIS-BR—476, pp 32) **Inclusive projectile fragmentation in light-and heavy-ion induced reactions in the spectator model.** Hussein, M.S.; McVoy, K.W.; Mastroleo, R.C. (Sao Paulo Univ., Brazil. Inst. de Fisica; Wisconsin Univ., Madison, USA. Dept. of Physics; Centro Tecnico Aeroespacial, Sao Jose dos Campos, Brazil. Inst. de Estudos Avancados). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49394 (INIS-BR—476, pp 38) **Effect of three boson interactions on nuclear spectroscopy.** Chen, C.H.-T.; Arima, A.; Lima, C.L. (Sao Paulo Univ., Brazil. Inst. de Fisica; Tokyo Univ., Japan; Rio de Janeiro Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49395 (INIS-BR—476, pp 39) **Deformed bosons in the Nilsson scheme.** Chen, C.H.-T.; Lee, S.Y.; Tsai, S.F.; Lin, L. (Sao Paulo Univ., Brazil. Inst. de Fisica; Brookhaven National Lab., Upton, NY, USA; Tayuan Univ., China; Central Univ., Tayuan, China). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49396 (INIS-BR—476, pp 40) **Three-body problem in one dimension: Effect of core excitation on the bound and continuum states.** Takahashi, N.K.; Ueta, K. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49397 (INIS-BR—476, pp 40) **Faddeev wave functions of A=18 bound states.** Miyake, H.; Mizukami, A. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49398 (INIS-BR—476, pp 25) **Analytic evaluation of the effects of vacuum polarization on sub-barrier heavy-ion elastic scattering cross section.** Martines, A.R.; Hussein, M.S. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49399 (INIS-BR—476, pp 26) **Forward glory effects in elastic scattering of heavy-ions.** Villari, A.C.C.; Lepine-Szily, A.; Hussein, M.S.; Saad, M.M. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49400 (INIS-BR—476, pp 27) **Study of elastic scattering on heavy ion systems.** Villari, A.C.C.; Lepine-Szily, A.; Brieva, F. (Sao Paulo Univ., Brazil. Inst. de Fisica; Chile Univ., Santiago). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49401 (INIS-BR—476, pp 28) **Alternative method of obtaining σ sub(SOD) from elastic scattering data.** Villari, A.C.C.; Almeida, F.I.A. de. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49402 (INIS-BR—476, pp 29) **Role of peripheral partial waves in the anomalous large angle scattering of n-α nuclei.** Aleixo, A.N.; Canto, L.F.; Hussein, M.S.; Carrilho, P. (Sao Paulo Univ., Brazil. Inst. de Fisica; Rio de Janeiro Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49403 (INIS-BR—476, pp 31) **Dynamic polarization effects on sub-barrier heavy ion fusion cross-sections.** Franzin, V.L.M.; Hussein, M.S. (Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49404 (INIS-BR—476, pp 32-33) **Assessing nuclear transparency in heavy ion reactions.** Rego, R.A.; Hussein, M.S. (Centro Tecnico Aeroespacial, Sao Jose dos Campos, Brazil. Inst. de Estudos Avancados; Sao Paulo Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49405 (INIS-BR—476, pp 33-34) **Anomalous heavy ion optical potentials and dynamic polarization.** Hussein, M.S.; Aleixo, A.N.F.; Canto, L.F.; Carrilho, P.; Donangelo, R.J. (Sao Paulo Univ., Brazil. Inst. de Fisica; Rio de Janeiro Univ., Brazil. Inst. de Fisica). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49406 (INIS-BR—476, pp 36) **Doorway expansion treatment of nuclear coupled channels problems.** Hussein, M.S.; Moniz, E.J. (Sao Paulo Univ., Brazil. Inst. de Fisica; Massachusetts Inst. of Tech., Cambridge, USA. Center for Theoretical Physics). 1985. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703283.

In Annual report 1983-1984. Low energy nuclear physics-Experiment and theory.

49407 (INIS-mf—10199) **U(3) principle as base of a microscopical U(3) model for the clarification of the phenomenon of nuclear molecules. Development of an analytical concept describing nucleus-nucleus collisions in the framework of the Composite Particle Theory in the Bargmann space.** Bader, R. (Tuebingen Univ. (Germany, F.R.). Fakultaet fuer Physik). 18 Jul 1985. 180p. (In German). NTIS (US Sales Only), PC A09/MF A01. File Number DE86752601.

The tenor of this thesis is the regarding of the U(3) symmetry in the study of nuclear reactions. By the description of the two colliding fragments and their relative motion by means of U(3) quantum numbers U(3) channels and U(3) channel sets are defined. It is shown that in certain collisions the U(3) symmetry of U(3) channels is incompatible with the U(3) symmetry of the compound nucleus. For these U(3) channels the formation of the compound nucleus is forbidden. In this framework a microscopical U(3) model for the phenomenon of the nuclear molecule resonances is developed. U(3) barriers which play an important role in this model are responsible for the repulsion between the two fragments. By microscopical calculations it is confirmed that by the U(3) channels allowed above the U(3) barriers an attraction between the two fragments arises. This interchange of attraction and repulsion leads to the formation of nuclear molecules. Furthermore it is shown that this incompatibility and by this the phenomenon of nuclear molecule resonances can be reduced to an U(3) principle in which the Pauli principle is contained. Basing on this U(3) principle selection rules are formulated which predict candidates for nuclear molecule resonances. This explains why only some binary systems tend to the molecule formation.

49408 (INR—1930/IA/PL/A) **Nuclear deformation energies.** Blocki, J. (Institute of Nuclear Research, Warsaw (Poland)). 1982. 12p. Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland.

A foreword of the atlas of nuclear deformation energies is presented. Formulas for the shape parametrization together with an example of the applications of the maps are also given.

49409 (INS—534) **Origin of nuclear mass number dependence in EMC-effect.** Kurihara, Y.; Date, S.; Nakamura, A.; Sato, H.; Sumiyoshi, H.; Yoshinada, K. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Mar 1985. 18p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703147.

The origin of the mass number dependence of the nucleon structure functions extracted from the deep inelastic lepton-nucleus scattering is investigated by factorizing the structure function into A and x dependent parts. It is found that the mass number dependence is determined by the probability of exotic components in multi-nucleon overlap. This suggests that the deformation of the nucleon structure function is caused by the interaction among nucleons during their overlap.

49410 (INS—535) **Nuclear stopping power at high energies.** Date, S.; Gyulassy, M.; Sumiyoshi, H. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Mar 1985. 48p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703148.

Recent $p + A \rightarrow p + X$ data are analyzed within the context of the multi-chain and additive quark models. We deduce the average energy loss of a baryon as a function of distance traversed in nuclear matter. Consistency of the multi-chain model is checked by comparing the predictions for $p + A \rightarrow \pi^{+-} + X$ with data. We discuss the space-time development of baryon stopping and show how longitudinal growth limits the energy deposition per unit length. Predictions are made for the proton spectra to be measured in nucleus-nucleus collisions at CERN and BNL. Finally, we conclude that the stopping domain for central collisions of heavy ions extends up to center of mass kinetic energies KEsub(em) asymptotically equals 3 +- 1 AGev.

49411 (INS—538) **EMC effect and breaking of additivity of nucleons in the high-energy hadron-nucleus interactions.** Nikolaev, N.N. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1985. 48p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703149.

The EMC effect implies a strong violation of additivity of nucleons in the absorption of virtual photons by atomic nuclei. In this paper we analyze the experimental data on the hadron-nuclei interaction cross sections in search for similar effects in the scattering of hadrons on nuclei. Specifically, we look for deviations from predictions of the multiple scattering theory. We formulate, and make extensive use of the Glauber-Gribov universality of the hadron-nucleus interaction cross sections, which makes it possible to check in a unique way a consistency of the experimental data on the total, inelastic and absorption cross sections for all the incident hadrons. We find evidence for the effective cross section of interaction with bound nucleons being 5-15 % larger than with free nucleons. We comment on implications of this observation for models of the EMC effect.

49412 (LBL—21462) **Nucleon exchange in damped nuclear reactions.** Randrup, J. (Lawrence Berkeley Lab., CA (USA)). Apr 1986. Contract AC03-76SF00098. 20p. (CONF-8604165—9). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013203.

From International conference on heavy ion physics; Rochester, NY, USA (21 Apr 1986).

Starting from the general context of one-body nuclear dynamics, the nucleon-exchange mechanism in damped nuclear reactions is discussed. Some of its characteristic effects on various dinuclear observables are highlighted and a few recent advances are described.

49413 **(SLAC-PUB—3973) Minimal relativistic model for the three nucleon system.** Noyes, H.P. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). May 1986. Contract AC03-76SF00515. 4p. (CONF-8604194—5). NTIS, PC A02/MF A01; GPO Dep. File Number DE86012961.

From International symposium on three-body force in the three-nucleon system; Washington, DC, USA (24 Apr 1986).

A start is made on disentangling relativistic kinematic effects from "three body forces" by presenting a minimal relativistic model in which the internal mesonic degree of freedom is treated on the same footing as the nucleonic degrees of freedom. The meson is not allowed to appear asymptotically, specifying the two-nucleon "off shell" amplitudes which can be used to calculate the three nucleon problem. The results are identical to those obtained from the same model starting from three nucleons and one meson. In effect we have discovered a "relativistic potential model" which does not generate "three body forces". 14 refs.

49414 **Ground state energy of a hard-sphere Fermi fluid.** Baker G.A. Jr.; Benofy, L.P.; Fortes, M.; de Llano, M. (Theoretical Division, Los Alamos National Laboratory, University of California, Los Alamos, New Mexico 87545). **34**: No. 2, 678-685(Aug 1986).

A new method of computing the ground state energy of a Fermi fluid is developed and applied to the hard-sphere Fermi fluids of two and four components. We find the results to be highly accurate for low densities. In this paper we compute and report the perturbation series for the ground state energy for the soft, repulsive, square-well problem at a number of densities for a four-component Fermi system as well as the ladder approximation energies for a hard-sphere potential at the same densities.

49415 **Resolution of the magnetic moment problem in relativistic theories.** McNeil, J.A.; Amado, R.D.; Horowitz, C.J.; Oka, M.; Shepard, J.R.; Sparrow, D.A. (Department of Physics and Atmospheric Science, Drexel University, Philadelphia, Pennsylvania 19104). **34**: No. 2, 746-749(Aug 1986).

A Landau-Migdal approach to relativistic mean field theory of nuclear matter is used to define the single particle isoscalar current. By virtue of the near cancellation of scalar and vector potentials, this current is very close to the standard nonrelativistic isoscalar current; and hence the single particle isoscalar magnetic moment operator gives results in agreement with the nonrelativistic shell model. Calculations of magnetic moments for closed shell plus (or minus) one nucleon using this effective current operator recover the Schmidt values, thus resolving a longstanding problem with relativistic models of nuclear structure.

49416 **Direct E-italic2 neutron capture in light nuclei.** Castel, B.; Ho, Y.K. (Physics Department, Queen's University, Kingston, Canada). **34**: No. 2, 408-412(Aug 1986).

We present an analysis of the E-italic2 strength data recently available from thermal radiative neutron capture within the context of direct capture theory. The radiative capture data require a neutron E-italic2 effective charge identical to the one used in bound state shell model calculations, in marked contrast to the E-italic1 situation. We suggest that this difference has its origin in the nature of the coupling governing the particle-core interaction in E-italic2 and E-italic1 radiative capture processes.

49417 **Exotic states in QED.** Celenza, L.S.; Mishra, V.K.; Shakin, C.M.; Liu, K.F. (Department of Physics and Center for Nuclear Theory, Brooklyn College of the City University of New York, Brooklyn, New York 11210). **57**: No. 1, 55-57(7 Jul 1986).

We suggest that electron and positron peaks seen in large-Z-italic heavy-ion collisions originate in the decay of nontopological solitons consisting of a quasielectron and quasipositron which are formed in a new vacuum phase.

49418 **Monte Carlo studies of nuclear many-particle systems.** Negele, J.W. (Center for Theoretical Physics, Laboratory for Nuclear Science and Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). **43**: No. 3, 991-1016(Jun 1986).

Stochastic evaluation of path integrals provides a useful tool for the study of a variety of nuclear systems which are otherwise not amenable to definitive analysis through perturbative, variational, or stationary-phase approximations. Ground state properties of potential models, such as quantum fluctuations in the density, are examined. Tunneling problems in quantum many-particle systems, such as spontaneous fission and the ground state structure of systems with degenerate vacuua are treated by incorporating one's physical understanding of the essential collective degrees of freedom i the stochastic algorithm. The role of subnuclear degrees of freedom is studied by comparing the exact solution of a simple confining quark model with the solution to a phase-shift equivalent hadronic potential model.

49419 **NN and πD reduced widths of dibaryon resonances.** Duck, I.; Umland, E. (Rice Univ., Houston, TX). **96B**: No. 3-4, 230-232(3 Nov 1980).

The reduced widths of the conjectured $J = 2^+$ (2180) and $J = 3\pi$ (2220) dibaryon resonances in NN and D channels are calculated. The dibaryon resonances show up in proton-proton elastic scattering channels as very inelastic resonances with partial widths in the NN channel about 1/5 of the total width. Dibaryon resonance contributions to differential cross sections and polarization parameters were investigated using the coupling constants as adjustable parameters.

6540 Radiation And Shielding Physics

REFER ALSO TO CITATION(S) 49273, 49288, 49507

49420 **(INDC(BUL)—011/L) Legendre-series development of the anisotropy density of neutron elastic scattering by means of cubic splines.** Voykov, G.; Gadjokov, V.; Ilieva, K. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee; Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika). Feb 1986. 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703141.

The Legendre-series coefficients of the anisotropy density of neutron elastic scattering are computed starting from tabulated data and using the basis of natural cubic splines. The method is implemented and incorporated in the SUPERTOG package. Processing results are reported and compared with previous ones. 3 refs, 4 tabs.

49421 **(INDC(CCP)—253/L) Evaluation of resonance self-shielding factors for ^{238}U in the unresolved resonance region.** Komarov, A.V.; Luk'yanov, A.A. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Jan 1986. 16p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703142.

On the basis of a theoretical model of identical equidistant resonances for the energy dependence of cross-sections in the unresolved resonance region, the authors have parametrized the values of the resonance self-shielding factors and their Doppler increments for ^{238}U. They have proposed a method by which the Doppler increments of the self-shielding factors can be calculated from simple analytical formulae by redetermination of the model parameters. Analysing the experimental data on direct and capture transmissions in the unresolved resonance region, they demonstrate the possibility of describing those data as a whole and of deriving from them the cross-section group functionals. Translated from Russian. 20 refs, 2 figs, 4 tabs.

49422 **(INDC(CCP)—254/L) Group cross-sections and resonance self-shielding factors for ^{239}Pu in the unresolved resonance region.** Van'kov, A.A.; Toshkov, S.; Ukraintsev, V.F.; Yaneva, N. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Jan 1986. 14p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703143.

The authors analyse experimental data on the transmission and fission self-indication functions for ^{239}Pu in the unresolved resonance region. Use is made of the method of generating a cross-

section structure based on the multi-level R-matrix formalism (stochastic K-matrix method). Evaluations of the average resonance parameters and group constants for ^{239}Pu are made. Translated from Russian. 15 refs, 3 figs.

49423 (INIS-BR—492, pp 242-253) **Calculation of spatial distribution of the EURACOS II converter source.** Santo, A.C.F. de. (Instituto de Engenharia Nuclear, Rio de Janeiro, Brazil). 1985. (In Portuguese). NTIS (US Sales Only), PC A99/MF A01. File Number DE86703268. (CONF-8504255—).

From 5. national meeting of reactor physics; Rio de Janeiro, RJ, Brazil (10 Apr 1985).

It is obtained the neutron spatial flux from the EURACOS (Enriched Uranium Converter Source) device, adjusted to experimental measures. The EURACOS device is a converter source which is constituted a circle plate of highly enriched uranium (90%). The converter provides an intense source of fast neutrons which has the energetic spectrum near to the fission spectrum.

49424 (INIS-BR—492, pp 663-676) **Nuclear reactor shielding calculation using the ANISN and SABINE-3 nuclear codes.** Otto, A.C.; Pontedeiro, E.M.B.D.; Silva, R.C.O. da. (Instituto Militar de Engenharia, Rio de Janeiro, Brazil; Centro de Informacoes Nucleares, Rio de Janeiro, Brazil). 1985. (In Portuguese). NTIS (US Sales Only), PC A99/MF A01. File Number DE86703268. (CONF-8504255—).

From 5. national meeting of reactor physics; Rio de Janeiro, RJ, Brazil (10 Apr 1985).

The solution of coupled neutron and photon problems in shielding projects using two different methods are compared. The ANISN code, which solves the one-dimensional transport equation by the Sn method is compared with the SABINE-3 code which uses the removal - diffusion method (Spinney) in one dimension. The two codes were applied to typical reactor shielding calculation such as the German HTR (AVR), the Gas-Graphite power reactor (CALDER HALL) and the swimming-pool type research reactor (IEAR-1).

49425 (INIS-BR—492, pp 677-690) **Alternative technique for simulating volumetric cylindrical sources in the Morse code utilization.** Vieira, W.J.; Mendonca, A.G. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo, Brazil. Centro de Fisica Nuclear). 1985. (In Portuguese). NTIS (US Sales Only), PC A99/MF A01. File Number DE86703268. (CONF-8504255—).

From 5. national meeting of reactor physics; Rio de Janeiro, RJ, Brazil (10 Apr 1985).

In the solution of deep-penetration problems using the Monte Carlo method, calculation techniques and strategies are used in order to increase the particle population in the regions of interest. A common procedure is the coupling of bidimensional calculations, with (r,z) discrete ordinates transformed into source data, and tridimensional Monte Carlo calculations. An alternative technique for this procedure is presented. This alternative proved effective when applied to a sample problem.

49426 (INIS-mf—10173, pp 53) **Drift properties of electrons in gases.** Schmidt, B. (Heidelberg Univ., Germany, F.R. Physikalisches Inst.). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

49427 (INIS-mf—10173, pp 36) **Attenuation length measurement in narrow drift channels.** Rossi, L.; Gracco, V.; Sannino, M.; Traspedini, L. (European Organization for Nuclear Research, Geneva, Switzerland). Feb 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE86703196. (CONF-860272—Absts.).

From Wire chamber conference; Vienna, Austria (25 Feb 1986).

49428 (INIS-mf—10178) **Study of the hyperfine augmented nuclear polarization by elastic neutron scattering.** Scheer, U. (Technische Univ. Berlin (Germany, F.R.). Fachbereich Physik). 20 Nov 1984. 49p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE86752584.

The unpaired electrons of the transition metals produce high magnetic fields at the nucleus position (Co^{++}:18 Tesla). The splitting of the nuclear spin levels effected by this lies in the mK range (^{59}Co:ΔE/ksub(B)=8.7 mK). By cooling of the nuclear spin system to temperatures in the order of magnitude ΔE/ksub(B) nuclear polarization arises in the direction of the hyperfine field. Because the scattering length for neutron scattering depends on the relative orientation of the neutron spin to the nuclear spin (a^+ parallel, a^- antiparallel) at suited choice of the scattering geometry in an antiferromagnetic crystal (CoF_2:Tsub(N)=38 K) for unpolarized neutrons a new Bragg-reflex arises (CoF_2:001 reflex) the intensity of which is proportional to $(a^+-a^-)^2.I^2$ (with I=degree of polarization). By a demixing cryostat with a cooling power of 100 μW at 100 mK we could in about 900 hours cool the ^{59}Co nuclei in CoF_2 to 9.5 mK nuclear temperature. This corresponds to a degree of polarization of 37%. The long cooling time can be explained by the Schottky anomaly of the specific heat of the nuclear spin system. On a $DyPO_4$ crystal with natural isotope mixture of the dysprosium a value of $a^+-a^- = 2.07.10^{-12}$ cm was found. This lets for ^{161}Dy or ^{163}Dy an about equally large difference to be expected like it is present at hydrogen. This value is compared with all other known isotopes extremely large.

49429 (INIS-mf—10412) **Slowing down and straggling of protons and heavy ions in matter.** Aernsbergen, L.M. van. (Rijksuniversiteit Groningen (Netherlands)). 17 Jan 1986. 150p. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703116.

The Doppler Shift Attenuation (DSA) method is widely used to measure lifetimes of nuclear states. However, many of the lifetimes resulting from DSA measurements display large variations which are caused by an insufficient knowledge of slowing down processes of nucleus recoils. The measurement of 'ranges' is an often used method to study these slowing down processes. In this kind of measurement the distributions of implanted ions are determined for example by the method of Rutherford backscattering or from the yield curve of a resonant nuclear reaction. In this thesis, research on energy-loss processes of protons and Si ions in aluminium is presented. The so-called Resonance Shift method has been improved for the measurements on the protons themselves. This method has only been used occasionally before. A new method has been developed, which is called the Transmission Doppler Shift Attenuation (TDSA) method, for the measurement on Si ions. Includes Dutch summary; 145 refs.; 49 figs.; 10 tabs.

49430 (JAERI-M—84-244) **PALLAS-2DCY-FX: a code for direct integration of transport equation in two-dimensional (R, Z) geometry.** Takeuchi, Kiyoshi; Sasamoto, Nobuo; Kanai, Yasuji. (Japan Atomic Energy Research Inst., Tokyo; Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Feb 1985. 101p. NTIS (US Sales Only), PC A06/MF A01. File Number DE86703220.

The PALLAS-2DCY-FX program is the revised version of the PALLAS-2DCY code, which was designed in 1973 and revised in 1980, based on a method of direct integration of the Boltzmann transport equation to describe the radiation transport in (r,z) two-dimensional geometry. It has been developed for shielding problems involving the transport of neutrons and photons. A special feature of the present code is inclusion of the routine for analytical calculation of uncollided flux for accurate calculation of duct and void streaming or skyshine. The document gives a full description of input and output data, as well as code implementation information and a description of several demonstration problems.

49431 **(RAL—85-017) Monte Carlo evaluation of analytical multiple scattering corrections for unpolarised neutron scattering and polarisation analysis data.** Mayers, J.; Cywinski, R. (Rutherford Appleton Lab., Chilton (UK)). Mar 1985. 35p. NTIS (US Sales Only), PC A03/MF A01. File Number DE86703144.

Some of the approximations commonly used for the analytical estimation of multiple scattering corrections to thermal neutron elastic scattering data from cylindrical and plane slab samples have been tested using a Monte Carlo program. It is shown that the approximations are accurate for a wide range of sample geometries and scattering cross-sections. Neutron polarisation analysis provides the most stringent test of multiple scattering calculations as multiply scattered neutrons may be redistributed not only geometrically but also between the spin flip and non spin flip scattering channels. A very simple analytical technique for correcting for multiple scattering in neutron polarisation analysis has been tested using the Monte Carlo program and has been shown to work remarkably well in most circumstances.

49432 **(ZfK—562) Proceedings of the 14. International Symposium on the Interaction of Fast Neutrons with Nuclei - Neutron Generators and Application - organized by the Technical University of Dresden.** Seeliger, D.; Jahn, U. (eds.). (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Jul 1985. 131p. (In English and Russian). (CONF-8411262—). NTIS (US Sales Only), PC A07/MF A01. File Number DE86703145.

From 14. international symposium on the interaction of fast neutrons with nuclei; Gaussig, German D.R. (19 Nov 1984).

The symposium was devoted to current problems of intense fast neutron sources, especially 14 MeV DT-neutron generators, and their broad spectrum of application in nuclear physics. 56 participants from 12 countries and the IAEA demonstrate the high interest on this selected topic. The submitted contributions can be divided into two general parts. The first one gives a review about the different possibilities of the technical and technological solution in development, the present status of operation and also the problems connected with the use of intense neutron sources. Various experimental arrangements for neutron spectroscopy, determination of nuclear data and theoretical aspects are the content of the second part. The participation in this meeting of designer and operators on the one hand and users of neutron sources on the other hand was a good choice and stimulated productive discussions during the conference.

6550 Medical Physics

REFER ALSO TO CITATION(S) 47775, 48654, 48699, 48700, 48701

49433 **(DOE/EV/03333—T8) Compton scatter correction for the MGH analog ring positron camera.** Wolfson, D.R. (Massachusetts Inst. of Tech., Cambridge (USA)). 1986. Contract AC02-76EV03333. 50p. Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, MA 02139. File Number TI86012566.

Thesis.

A technique for reducing Compton scatter effects in positron tomographs is demonstrated. A cylindrical container of water is used to approximate the properties of the brain. The contribution of scattered radiation to point source images is observed. The dependency of this contribution on point source location is quantified. By regarding an arbitrary image as an aggregation of point sources, the total scatter distribution may be calculated as a weighed superposition of the measured contributions. A Monte Carlo simulation is used to investigate the dependence of scatter effects on cylinder radius and on activity outside the image plane. The correction scheme is tested with several phantoms. 9 refs., 14 figs.

49434 **(GSF—26/85) Occupational exposure to ionizing radiation. A survey and its results.** Drexler, G.; Eckerl, H. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz). Oct 1985. 65p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752612.

There are at present about 220,000 persons in the Federal Republic of Germany who are regularly monitored for radiation safety at the place of work in accordance with the Radiation Protection Ordinance. The great majority (more than 70%) are working in the medical field. Other occupations include the craft business, physical technical laboratory personnel, and physicists and chemists. Therefore, strategies and methods of radiation protection form an important part of the measures to provide on-the-job safety. The activities in this field range from the definition of suitable monitoring schemes in general to sepcific means and methods of measuring whole-body dose, local dose, personal dose, internal exposure due to incorporation. Another important aspect is quality assurance of the measures taken.

49435 **(INIS-mf—9900) Data compiled by a study group of the managing board on the association's attitude towards issues of radiation protection. Discussion paper.** (Fachverband fuer Strahlenschutz e.V., Karlsruhe (Germany, F.R.)). Nov 1984. 55p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE86752572.

The study group concentrated on general aspects of radiation protection. The data compilation is subdivided into general regulations, principles of radiation protection, radiation protection measures for occupationally exposed personnel, protection of the environment and of the population. A description of the association's attitude towards a certain aspect is followed in each case by an exhaustive discussion.

49436 (INIS-mf—10402, pp 15) **Evolution of radiation protection standards.** Swindon, T.N. (Australian Radiation Lab., Melbourne). Aug 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE86780480. (CONF-8508179—).

From 10. AINSE radiation biology conference; Lucas Heights, Australia (22 Aug 1985).

49437 **(ORNL—6296) Eleventh ORNL personnel dosimetry intercomparison study, May 22-23, 1985.** Swaja, R.E.; Oyan, R.; Sims, C.S. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 63p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86013815.

The Eleventh Personnel Dosimetry Intercomparison Study was conducted at the Oak Ridge National Laboratory (ORNL) during May 22-23, 1985. Dosimeter badges from 44 participating organizations were mounted on Lucite block phantoms and exposed to four mixed-radiation fields with neutron dose equivalents around 5 mSv and gamma dose equivalents between 0.1 and 0.7 mSv. Results of this study indicated that no participants had difficulty obtaining measurable indication of neutron exposure at the provided dose equivalent levels, and very few had difficulty obtaining indication of gamma exposure at dose equivalents as low as 0.10 mSv. Average neutron results for all dosimeter types were within 20% of reference values with no obvious spectrum dependence. Different dosimeter types (albedo, direct interaction TLD, film, recoil track, and combination albedo-track) with 10 or more reported measurements provided average results within 35% of reference values for all spectra. With regard to precision, about 80% of the reported neutron results had single standard deviations within 10% at the means which indicates that precision is not a problem relative to accuracy for most participants. Average gamma results were greater than reference values by factors of 1.07 to 1.52 for the four exposures with TLD systems being more accurate than film. About 80% of all neutron results and 67% of all gamma results met regulatory standards for measurement accuracy and approximately 70% of all neutron data satisfied national dosimetry accreditation criteria for accuracy plus precision. In general, neutron dosimeter performance observed in this intercomparison was much improved compared to that observed in the prior studies while gamma dosimeter performance was about the same.

6560 Solid-state Physics

REFER ALSO TO CITATION(S) 47953, 48013, 48038, 49185, 49186

49438 (DOE/ER/45079—T1) Theoretical studies of sliding charge density waves, rigid layer modes of layered compounds and states of incommensurate structures. Final technical report, February 14, 1984-October 14, 1985. Sokoloff, J.B. (Northeastern Univ., Boston, MA (USA)). 1985. Contract FG02-84ER45079. 9p. NTIS, PC A02. File Number DE86014642.

The studies were conducted on the following topics: dynamical threshold behavior of a sliding charge density wave; domain motion and threshold behavior of charge-density waves; anomalous rigid-layer modes in layered compounds (such as graphite); and unusual band structure, wave functions and electrical conductance in crystals with incommensurate periodic potentials. (DLC)

49439 (DOE/ER/45189—1) Growth and dynamics of scale invariant matter. Progress report and continuation request. Savit, R.; Sander, L.M. (Michigan Univ., Ann Arbor (USA). Dept. of Physics). 8 Aug 1986. Contract FG02-85ER45189. 19p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014478.

Research concentrates on the growth of crystals. Solutions are sought for problems in growth velocity and the modeling of nonequilibrium and disorderly irreversible growth. A list of publications resulting from this work is included. (DWL)

49440 (IFUSP-P—549) On the equivalence of dilute antiferromagnets and ferromagnets in random external fields: Curie-Weiss models. Perez, J.F.; Pontin, L.F.; Segundo, J.A.B. (Sao Paulo Univ. (Brazil). Inst. de Fisica; Escola Federal de Engenharia de Itajuba, Minas Gerais (Brazil). Inst. Basico). 1985. 9p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703115.

Using a method proposed by van Hemmen the free energy of the Curie-Weiss version of the site-dilute antiferromagnetic Ising model is computed, in the presence of an uniform magnetic field. The solution displays an exact correspondence between this model and the Curie-Weiss version of the Ising model in the presence of a random magnetic field. The phase diagrams are discussed and a tricritical point is shown to exist.

49441 (LA-UR—86-2528) Model of cohesive properties and structural phase transitions in non-metallic solids. Majewski, J.A.; Vogl, P. (Los Alamos National Lab., NM (USA). Center for Nonlinear Studies; Polska Akademia Nauk, Warsaw. Inst. Fizyki; Graz Univ. (Austria). Inst. fuer Theoretische Physik). 1986. Contract W-7405-ENG-36. 5p. (CONF-860892—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013832.

From 18. international conference on physics of semiconductors; Stockholm, Sweden (11 Aug 1986).

We have developed a simple, yet microscopic and universal model for cohesive properties of solids. This model explains the physical mechanisms determining the chemical and predicts semiquantitatively static and dynamic cohesive properties. It predicts a substantial softening of the long-wavelength transverse optical phonons across the pressure induced phase transition from the zincblenda to rocksalt structure in II-VI compounds. The origin of this softening is shown to be closely related to ferroelectricity.

49442 Monte Carlo simulation of continuous-space crystal growth. Dodson, B.W.; Taylor, P.A. (Sandia National Laboratories, P.O. Box 5800, Albuquerque, New Mexico 87185). **34**: No. 4, 2112-2115(15 Aug 1986). Contract AC04-76DP00789.

We describe a method, based on Monte Carlo techniques, of simulating the atomic growth of crystals without the discrete lattice space assumed by conventional Monte Carlo growth simulations. Since no lattice space is assumed, problems involving epitaxial growth, heteroepitaxy, phonon-driven mechanisms, surface reconstruction, and many other phenomena incompatible with the lattice-space approximation can be studied. Also, use of the Monte Carlo method circumvents to some extent the extreme limitations on simulated timescale inherent in crystal-growth techniques which might be proposed using molecular dynamics. The implementation of the new method is illustrated by studying the growth of strained-layer superlattice (SLS) interfaces in two-dimensional Lennard-Jones atomic systems. Despite the extreme simplicity of such systems, the qualitative features of SLS growth seen here are similar to those observed experimentally in real semiconductor systems.

49443 Spin-orbit splitting in semiconductors and insulators from the a-italicb-italic i-italicn-italici-italict-italici-italico-italic pseudopotential. Hybertsen, M.S.; Louie, S.G. (Department of Physics, University of California, Berkeley, California 94720 and Materials and Molecular Research Division, Lawrence Berkeley Laboratory, Berkeley, California 94720). **34**: No. 4, 2920-2922(15 Aug 1986). Contract AC03-76SF00098.

In this Brief Report, we give the expressions required for using the vector (spin-orbit) part of the a-italicb-italic i-italicn-italici-italict-italici-italico-italic pseudopotential in a crystalline calculation. Inclusion of the spin-orbit interaction using the vector part of the pseudopotential in first order reproduces the measured spin-orbit splittings in Ge as well as the rare-gas solids and agrees with all-electron calculations.

49444 Indirect phase detection of NMR spinor transitions. Suter, D.; Pines, A.; Mehring, M. (Department of Chemistry, University of California, Berkeley, California 94720 and Materials and Molecular Research Division, Lawrence Berkeley Laboratory, Berkeley, California 94720). **57**: No. 2, 242-244(14 Jul 1986). Contract AC03-76SF00098.

The behavior of quantum mechanical state functions under selective rotations is discussed. If a two-level transition is phase shifted with composite z-italic pulses, the component state function shared with a connected transition can be multiplied by i-italic, thereby shifting the corresponding coherence into an orthogonal channel. Application to the sensitive indirect detection of NMR transitions is demonstrated.

49445 Dissipation due to a "valley wave" channel in the quantum Hall effect of a multivalley semiconductor. Rasolt, M.; Halperin, B.I.; Vanderbilt, D. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **57**: No. 1, 126-129(7 Jul 1986). Contract AC05-84OR21400.

When the quantized Hall effect occurs at a semiconductor surface such as Si(110), where the carriers have a time-reversal valley degeneracy, there should be a spontaneous valley polarization at appropriate values of the filling factor ν. There can then be dissipation at T-italic = 0 due to radiation of Goldstone bosons ("valley waves") at impurity sites, provided that the current density exceeds a critical value j-italic/sub c-italic/ determined by the inter-valley electron-electron scattering or other terms which modify the valley-wave dispersion at long wavelengths. The dissipation above j-italic/sub c-italic/ is described by a constant resistivity rho/sub x-italic//sub x-italic/, which should be small but measureable, and sensitive to the density of neutral impurities.

49446 Anomalous diffusion on and elastic vibrations of two square hierarchical lattices. Liu, S.H.; Liu, A.J. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **34**: No. 1, 343-346(1 Jul 1986). Contract AC05-84OR21400.

Square hierarchical lattices are two-dimensional self-similar space-filling lattices which lack translational symmetry. In this paper, we report our study of the anomalous diffusion and lattice vibration properties of two distinct square hierarchical lattices.

49447 Thermodynamic criteria for grain-boundary melting; A molecular-dynamics study. Broughton, J.Q.; Gilmer, G.H. (Materials Science Department, Statue University of New York at Stony Brook, Stony Brook, New York 11794). **56**: No. 25, 2692-2695(23 Jun 1986).

Interface melting in various tilt boundaries between crystals of Lennard-Jones particles is predicted by a harmonic analysis of

the ground-state configurations. Interface excess free energies obtained in this way are extrapolated to the triple point, and these values are compared with the crystal-melt excess free energy. The validity of the method is confirmed by direct comparisons with high-temperature structures obtained by molecular-dynamics techniques, and with excess free energies obtained from the same simulations. Systems containing boundaries that exhibit interface melting experience disorder at the melting point, whereas the others can be superheated.

49448 **Analysis of the decay of picosecond fluorescence in semiconductors. Criteria for the presumption of electroneutrality during the decay of an exponential electron-hole profile.** Feldberg, S.W.; Evenor, M.; Huppert, D.; Gottesfeld, S. (Brookhaven National Lab., Upton, NY). *Journal of Electroanalytical Chemistry;* **185**: 209-228(1985). Contract AC02-76CH00016.

When an exponential profile of electron-hole pairs is photogenerated (in a semiconductor) with a delta-function light pulse, unequal diffusion coefficients of holes and electrons (i.e. D/sub e/ not equal to D/sub h/) effect deviations from electroneutrality as electrons and holes diffuse into the bulk semiconductor. These deviations will in turn effect errors in the analysis of data (e.g. time resolved fluorescence) when using theory based on the presumption of electroneutrality. The authors deduce here the experimental conditions required for an effective electroneutrality to be maintained during the course of an experiment. Analyses were carried out using computer simulations without the presumption of electroneutrality and the analytic solution with the presumption of electroneutrality. The differences in the measured fluorescences predicted by the two computations are characterized as a function of a variety of experimental parameters and physical properties: intensity (of the excitation pulse), the absorption of the exciting and emitted light, the ratio D/sub h//D/sub e/, bulk dielectric constant of the semiconductor, bulk and surface recombination kinetics. It is shown that a condition of adequate electroneutrality can be effectively attained when a well defined a minimum number of electron-hole pairs is generated; an upper limit of the number of e^--h^+ pairs is also established in order to avoid an intolerable temperature pulse. 12 references, 10 figures, 1 table.

6561 Superconductivity

REFER ALSO TO CITATION(S) 47914, 47915, 47960, 47961, 47964, 47971, 47975

49449 **Recursion method in the k-space representation.** Anlage, S.M.; Smith, D.L. (Department of Applied Physics, California Institute of Technology, Pasadena, California 91125). **34**: No. 4, 2336-2345(15 Aug 1986).

We show that by using a unitary transformation to k space and the special-k-point method for evaluating Brillouin-zone sums, the recursion method can be very effectively applied to translationally invariant systems. We use this approach to perform recursion calculations for realistic tight-binding Hamiltonians which describe diamond- and zinc-blende-structure semiconductors. Projected densities of states for these Hamiltonians have band gaps and internal van Hove singularities. We calculate coefficients for 63 recursion levels exactly and for about 200 recursion levels to a good approximation. Comparisons are made for materials with different magnitude band gaps (diamond, Si, α-Sn). Comparison is also made between materials with one (e.g., diamond) and two (e.g., GaAs) band gaps. The asymptotic behavior of the recursion coefficients is studied by Fourier analysis. Band gaps in the projected density of states dominate the asymptotic behavior. Perturbation analysis describes the asymptotic behavior rather well. Projected densities of states are calculated using a very simple termination scheme. These densities of states compare favorably with the results of Gilat-Raubenheimer integration.

6570 Theoretical Physics

REFER ALSO TO CITATION(S) 48362, 49130, 49183, 49187, 49191, 49196, 49467

49450 **(BNL—38386) Interpretation of glancing-incidence scattering measurements.** Church, E.L.; Takacs, P.Z. (Army Research and Development Command, Dover, NJ (USA); Brookhaven National Lab., Upton, NY (USA)). Mar 1986. Contract AC02-76CH00016. 9p. (CONF-860366—11). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014177.

From SPIE technical symposium on applications of artificial intelligence; Orlando, FL, USA (31 Mar 1986).

The practical testing and specification of x-ray and uv mirrors requires a scattering theory to link topographic finish errors and functional performance. This paper examines various smooth-surface theories that have been proposed for this purpose, with particular attention to their behavior near the critical angle where the surface reflectivity is a rapid function of angle. Of the various diffraction theories considered, Rayleigh-Rice vector perturbation theory is the most realistic; and predicts scattering distributions that are characteristically different from those of the canonical model. In some cases these differences or anomalies are similar to those observed by Yoneda and by Matsushita et al., which have previously been interpreted using geometrical-optics models. But there are differences. For example, the Rayleigh-Rice theory predicts anomalous scattering near the critical angle above the glancing angle of incidence ("anti-Yoneda effect"). Results are illustrated by calculations for strawman scattering experiments.

49451 **(CNRS-CPT—85-P-1790) Bounds on resolvents of dilated Schroedinger operators with non trapping potentials.** Duclos, P.; Klein, M. (Centre National de la Recherche Scientifique, 13 - Marseille (France). Centre de Physique Theorique). Jun 1985. 5p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86750867.

We provide bounds on resolvents of dilated Schroedinger operators via an exterior scaling. It is done under a non trapping condition on the potential which has a clear interpretation in classical mechanics. These bounds are a powerful tool to prove absence of resonances due to the tail of the potential in the shape resonance problem.

49452 (CONF-8409129—, pp 119-130) **Physical explanation of quasiperiodic motion and the onset of chaos in nonlinear systems.** Taylor, H.S. (Univ. of Southern California, Los Angeles). 1984. NTIS, PC A10/MF A01. File Number DE85007692.

From 3. international conference on multiphoton processes; Iraklion, Crete, Greece (4 Sep 1984).

The reader may have noticed that the subject broadly called classical and quantum nonlinear dynamics has lately gained considerable attention in many fields of physics and chemistry. Of particular interest is the dynamics of systems of many oscillators coupled by nonlinear interactions. Such systems are used to model widely spread phenomena, for example, molecular vibrations, intra-molecular energy transfer, unimolecular reaction, and laser-matter interactions. In the latter case, the laser is viewed, using the classical idea of extended phase space, or quantum field theory, as an oscillator. Hence, multiphoton excitations of atomic, molecular and plasma systems are described using oscillators coupled in a nonlinear manner. In a completely different area we find the motion of galaxies is also modeled by nonlinear oscillators. Recently the physics of light traveling in fibers (fiber optics) has been shown to obey similar equations. Atomic and molecular physics is far from left out. The nature of electronic excited states (e.g., double excited Rydberg states) and the whole question of the ability to assign quantum numbers to states and to corresponding spectra involves nonlinear ideas. The unusual behavior of electronic states in strong external fields is essentially governed by nonlinear equations. 22 references, 8 figures, 1 table.

49453 **(IAE—1965/CYFRONET/PM/A) Simple waves in quasilinear hyperbolic systems. Part 1. Theory of simple waves and simple states. Examples of applications.** Grundland, A.M.; Zelazny, R. (Institute of Atomic Energy, Swierk (Poland)). 1983. 47p. Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland.

A new method of construction of solutions to nonlinear, nonelliptic systems of partial differential equations and especially nonhomogeneous ones is presented. These equations have been considered from the point of view of integral elements. The connections between the structure of the set of integral elements and the possibility of a construction of special classes of solutions have been studied. These classes consist of what is called simple waves and k-waves (for homogeneous systems). They provide us with a possibility for a selection of simple integral elements from the set of all integral elements. Analysis has been performed using differential forms and Cartan theory of system in involution. The problem has been reduced to examining Pfaff forms. The Cauchy problem for Pfaff systems has been formulated and solved using the Riemann function. Some remarks concerning the notion of Baecklund transformations for the case of k-waves have been formulated. It is shown that in contrast to simple wave, the simple state has no gradient catastrophy. The presented technique of constructing the solutions in the form of simple states has been illustrated by the examples of Korteweg de Vries and four-dimensional Klein-Gordon, Sine-Gordon and Liouville equations. It has been shown that the known soliton equations are closely connected with the elliptical functions and especially with the P-Weierstrass functions.

49454 **(ORNL/TM—10034) Vectorized difference schemes for a three dimensional enthalpy formulation for phase change problems.** Williams, M.A.; Wilson, D.G. (Oak Ridge National Lab., TN (USA)). Jul 1986. Contract AC05-84OR21400. 23p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014402.

Fully vectorized codes have been written for the CRAY X-MP implementing explicit and implicit finite difference schemes for enthalpy formulations of three dimensional Stefan-like problems. The implicit scheme is that proposed by C.M. Elliot and J.R. Ockendon. The explicit scheme is intended to provide a comparison for the results from the implicit scheme. Vectorization of the code required some ingenuity since material properties change discontinuously as solidification proceeds. Boolean variables were used to avoid conditional branches in DO loops. Average vector length was greatly increased by unfolding three dimensional arrays and treating them as long vectors. This report documents the development of the code and the vectorization strategies. The investigation of the tradeoffs between the implicit scheme, potentially capable of taking large time steps, and the explicit scheme, whose time step size is limited by the stability criterion, has begun but is not complete. 4 refs., 6 figs.

49455 **(SLAC-PUB—4008) Construction of relativistic quantum theory: a progress report.** Noyes, H.P. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jun 1986. Contract AC03-76SF00515. 66p. (CONF-8506303—1). NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014649.

From 7. annual international meeting of the Alternative Natural Philosophy Association; Cambridge, UK (28 Jun 1985).

We construct the particulate states of quantum physics using a recursive computer program that incorporates non-determinism by means of locally arbitrary choices. Quantum numbers and coupling constants arise from the construction via the unique 4-level combinatorial hierarchy. The construction defines indivisible quantum events with the requisite supraluminal correlations, yet does not allow supraluminal communication. Measurement criteria incorporate c, h-bar and m/sub p/ or (not "and") G, connected to laboratory events via finite particle number scattering theory and the counter paradigm. The resulting theory is discrete throughout, contains no infinities, and, as far as we have developed it, is in agreement with quantum mechanical and cosmological fact.

49456 **(UCID—20846) Aspects of Raman scattering and other effects on laser propagation through the atmosphere. Summary of work for the period, May 5, 1986-June 13, 1986.** Ipser, J.R. (Lawrence Livermore National Lab., CA (USA)). Aug 1986. Contract W-7405-ENG-48. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86015152.

The propagation of laser beams through the atmosphere is discussed. Processes which are pertinent are Raman scattering, self-focusing of beams, and two-photon absorption. Comments on the subroutine PRAMAN are given in the appendix. This subroutine calculates the effect of stimulated Raman scattering in the atmosphere. (WRF)

49457 **Numerical method for unitary systems.** Shipsey, E.J. (Department of Physics, University of Texas, Austin, Austin, Texas 78712). *Journal of Computational Physics;* **66**: No. 1, 218-224(Sep 1986).

A method of constructing probability amplitudes is presented for cases in which the corresponding unitary propagator can be expressed in terms of the Cayley representation. The method is most appropriate when the Hermitian matrix in the Cayley representation is sparse. The algorithm is organized for minimum storage.

49458 **Scattering of a pulse by a cavity in an elastic half-space.** Scandrett, C.L.; Kriegsmann, G.A.; Achenbach, J.D. (Department of Engineering Sciences and Applied Mathematics, Technological Institute, Northwestern University, Evanston, Illinois 60201). *Journal of Computational Physics;* **65**: No. 2, 410-431(Aug 1986).

The finite difference technique is employed to study plane strain scattering of pulses from finite anomalies embedded in an isotropic, homogeneous, elastic half-space. In particular, the scatterer is taken to by a cylindrical cavity. A new transmission boundary condition is developed which transmits energy conveyed by Rayleigh surface waves. This condition is successfully employed in reducing the domain of numerical calculations from a semi-infinite to a finite region. A test of the numerical scheme is given by considering a time harmonic pulse of infinite extent. The numerical technique is marched out in time until transients have radiated away and a steady state solution has been reached which is found to be in good agreement with results produced by a series type solution. Time domain solutions are given in terms of time histories of displacements at the half-space free surface; and by sequences of snapshots, taken of the entire numerical domain, which illustrate the scattering dynamics.

49459 **Closed, analytic, boson realizations for Sp(4).** Klein, A.; Zhang, Q. (Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania 19104-6396). *Journal of Mathematical Physics (New York);* **27**: No. 8, 1987-1993(Aug 1986).

The problem of determing a boson realization for an arbitrary irrep of the unitary simplectic algebra Sp(2d-italic) [or of the corresponding discrete unitary irreps of the unbounded algebra Sp(2d-italic,R-italic)] has been solved completely in recent papers. This solution is not known in closed analytic form except for d-italic = 1 and for special classes of irreps for d-italic>1. A different method of obtaining a boson realization that solves the full problem for Sp(4) is described. The method utilizes the chain Sp(2d-italic)⊃SU(2) x SU(2) x xxx x SU(2) (d-italic times), which, for d-italic> or =4, does not provide a complete set of quantum numbers. Though a simple solution of the missing label problem can be given, this solution does not help in the construction of a mapping algorithm for general d-italic.

49460 **Tricritical points in three-dimensional X-italicY-italic model with mixed action.** Janke, W.; Kleinert, H. (University of California, San Diego, La Jolla, California 92093). **57**: No. 3, 279-282(21 Jul 1986).

We present theoretical arguments (using mean fields and strong-coupling graphs) for a line of first-order phase transitions in the three-dimensional X-italicY-italic model with the mixed action β cos(del/sub i-italic/theta)+γ cos(2del/sub i-italic/theta) where $\gamma\epsilon(0.35,0.40)$, and verify its existence by a Monte Carlo simulation.

49461 Periodically pulsed spin dynamics: Scaling behavior of semiclassical wave functions. Nakamura, K.; Okazaki, Y.; Bishop, A.R. (Fukuoka Institute of Technology, Higashi-ku, Fukuoka 811-02, Japan). **57**: No. 1, 5-8(7 Jul 1986).

Quantum analogs of Kolmogorov-Arnol'd-Moser tori and chaos in a periodically pulsed single-spin system are studied in the semiclassical regime. Wave functions (quasienergy states) are described in a spin-coherent state representation. Their projected binary-phase patterns are characterized in terms of the fractal dimensions of their perimeters.

49462 Algebraic approach to dissociation from bound states. Alhassid, Y.; Engel, J.; Iachello, F. (A. W. Wright Nuclear Structure Laboratory, New Haven, Connecticut 06511). **57**: No. 1, 9-12(7 Jul 1986).

An algebraic treatment of continuous spectra based on noncompact groups is extended to allow discussion of dissociation from bound states. Transition matrix elements between bound and continuum states can be evaluated algebraically by the construction of transition operators that transform according to the infinite-dimensional unitary representations of the noncompact dynamical group. The method is employed to calculate dissociation rates in the Morse potential, for which the relevant group is SO(2,1).

49463 Approximate theory of Stokes amplification and conversion valid at large gain. Druehl, K.J.; Shakir, S.; Yousaf, M. (Institute for Modern Optics, Center for High Technology Materials, University of New Mexico, Albuquerque, New Mexico 87131). **11**: No. 7, 446-448(Jul 1986).

We predict Stokes-beam divergence, origin, and gain for large-gain Raman amplifiers as functions of pump-beam divergence and pump power in terms of simple analytical expressions. Stokes divergence is found to peak at a pump power twice above threshold. Results are in excellent agreement with exact computer solutions and explain recent experimental observations.

49464 Hypercharge fields and Eoetvoes-type experiments. Thieberger, P. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). **56**: No. 22, 2347-2349(2 Jun 1986).

It is shown that Eoetvoes-type torsion-balance experiments performed in the vicinity of a large cliff may be used as sensitive tests for the recently postulated existence of a medium-range hypercharge force. The residual nonzero effect found in the original Eoetvoes results could be mainly due to terrain irregularities and thus be larger than, but still correlated to, the effects expected from the earth's rotation and the hypercharge hypothesis.

49465 Monte Carlo molecular dynamics simulations for two-dimensional magnets. Kawabata, C.; Takeuchi, M.; Bishop, A.R. (Okayama University Computer Center, Okayama 700, Japan). **43**: No. 3, 869-872(Jun 1986).

A combined Monte Carlo molecular dynamics simulation technique is used to study the d-italicy-italicn-italica-italicm-italici-italicc-italic structure factor on a square lattice for isotropic Heisenberg and planar classical ferromagnetic spin Hamiltonians.

6580 Mathematical Physics

REFER ALSO TO CITATION(S) 49453, 49454, 49457, 49465, 49604, 49623, 49625, 49638

49466 (AD-A—167484/5/XAB) L_4 contraction for systems of conservation laws. Technical summary report. Patino, J.G.S. (Wisconsin Univ., Madison (USA). Mathematics Research Center). Feb 1986. 11p. (MRC-TSR—2917). NTIS, PC A02/MF A01.

The Cauchy problem for a 2 x 2 system of conservation laws in one dimension is u/sub t/ + (f(u))/sub x/ = 0, x epsilon R, t > 0 u(x,0) = u/sub O/ where u = (u_1, u_2), f = (f1 (u), f/sub (u)/). Such systems of equations usually come from the application of the laws of conservation for physical quantities like mass, momentum and energy, and arise in problems of gas dynamics, elasticity, oil-reservoir simulation and other areas of engineering. The questions of decay and continuous dependence with respect to the initial data are central issues in the study of the problem above. The result proved here rules out the use of certain functionals to study the decay of solutions and is relevant to the issue of L_4 continuity with respect to the data.

49467 Simulations: A tool for studying quantum condensed matter systems. Scalapino, D.J. (Department of Physics, University of California, Santa Barbara, California 93106). **43**: No. 3, 757-770(Jun 1986).

Quantum Monte Carlo techniques provide a new method for studying the properties of condensed matter systems. A review of this approach and the type of information which it can provide is given.

49468 Vibrational stabilizability of distributed parameter systems. Meerkov, S.M. (Illinois Institute of Technology, Chicago). *Journal of Mathematical Analysis and Applications;* **98**: No. 2, 408-418(Feb 1984). Contract AC02-80ER10709.

A condition of vibrational stabilizability for a class of linear partial differential equations is given. An example of vibrational stabilization in a nonlinear situation (Benard instability) is described. 12 references.

70 FUSION ENERGY

7001 Plasma Research

REFER ALSO TO CITATION(S) 48350, 48351, 49069, 49097, 49585, 49590

49469 (AD-A—167804/4/XAB) Current enhancement for hose-unstable electron beams. Memorandum report. Fernsler, R.F.; Hubbard, R.F.; Hui, B.; Joyce, G.; Lampe, M. (Naval Research Lab., Washington, DC (USA)). 24 Apr 1986. 74p. (NRL-MR—5769). NTIS, PC A04/MF A01.

An electron beam injected into a conducting medium produces inductive electric fields. These fields drive conduction currents which, for stable beams, oppose the beam current and thereby reduce the total (net) current. For unstable beams which undergo large transverse displacements, the inductive field can reverse direction and drive conduction current parallel to the beam current. An analytic and numerical treatment of the latter effect is presented to explain current enhancement as observed for electron beams propagating in gases at pressures above 10 torr.

49470 (AD-A—167849/9/XAB) Advanced concepts theory: annual report, 1985. Memorandum report, January-December 1985. (Naval Research Lab., Washington, DC (USA)). 23 Apr 1986. 122p. (NRL-MR—5759). NTIS, PC A06/MF A01.

This report contains the results of theoretical investigations and analyses on issues concerned with the production, interpretation, and understanding of radiation generated from dense hot plasmas. In particular, the radiation from imploding hollow z-pinch plasmas and ion beam-generated plasmas, the influence of radiation on the plasmas morphology, the x-ray conversion efficiency and spectral emission characteristics, dynamics of double gas puff implosions, imploding plasmas as opening switches, and analyses and interpretation of experimental results.

49471 (CEA-N—2430) Slowing of charged particles by particle methods. Mercier, B. (CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)). Mar 1985. 23p. (In French). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750862.

We review some facts about particle methods for solving linear hyperbolic equations. We show how one gets an evaluation of integral quantities like: $\int u(x,t)\,\mathrm{zeta}(x,t)\,dxdt$ where u denotes the solution and zeta an arbitrary weight function. Then, we apply the method to the equation describing charged particle transport in a plasma with emphasis on the evaluation of energy deposition on ions and electrons.

49472 **(CEA-N—2431) Implicit particle methods of order 1. Application to Vlasov-Poisson equation with fixed ions.** Hermeline, F. (CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)). Mar 1985. 37p. (In French). NTIS (US Sales Only), PC A03/MF A01. File Number DE86750861.

As a numerical example the implicit moment method has been applied to the multi-beam instabilities problem. In introducing implicit time schemes in Vlasov-Poisson equation resolution, low-frequency phenomena can be processed with an equal computing time. Some implicit resolution methods of MHD equations are introduced. The Langdon "direct" method is also presented.

49473 **(CLM-R—250) Calculation of spectral line emission from plasmas. 2. The organisation and use of basic atomic data.** Gordon, H.; Summers, H.P. (UKAEA Culham Lab., Abingdon). Jul 1985. 44p. H.M. Stationery Office, London, price Pound 5.00.

A set of computer codes has been developed for verification display and conversion of atomic cross-section and rate data drawn from the literature. Data for isoelectronic sequence members are prepared as rates in standard forms over standard reduced parameter ranges. Regularities in this 'general z' representative data are exploited to infer rates for arbitrary ions and to generate input for spectral prediction codes. The H, He, Li, Be and Na-like isoelectronic sequences have been incorporated in the database. The operation of the procedures is illustrated.

49474 **(CLM-R—253) FETRAN - a finite element transport modelling package.** Lee-Hsiao; Eastwood, J.W. (UKAEA Culham Lab., Abingdon). Jul 1985. 28p. H.M. Stationery Office, London, price Pound 4.00.

A new moving finite element formulation for equilibrium and transport modelling has been developed. This report describes the implementation of multifluid surface averaged transport using these moving finite elements. The program can be used for axisymmetric toroidal or cylindrical configurations of arbitrary cross section. Test results using INTOR parameters and geometry are presented.

49475 **(CONF-8510266—5) Production of high density plasma by pellet injection in TFTR.** Milora, S.L.; Schmidt, G.L.; Combs, S.K.; Bush, C.E.; Goldston, R.J.; Grek, B.; Hawryluk, R.J.; Johnson, D.; Mansfield, D.; Park, H. (Oak Ridge National Lab., TN (USA); Princeton Univ., NJ (USA). Plasma Physics Lab.). 1985. Contract AC05-84OR21400. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014027.

From International pellet fueling workshop; La Jolla, CA, USA (30 Oct 1985).

High plasma densities have been produced in ohmic and neutral beam heated discharges on TFTR using a repeating pneumatic pellet injector developed at Oak Ridge National Laboratory (ORNL). Line average plasma densities as high as 1 x 10^{14} cm^{-3} have been attained by injection of five 2.7 mm deuterium pellets $\Delta n/sub\ e/ = 2 \times 10^{14}$ cm^{-3} over a one-second interval into a stetched neutral beam pulse. Injection of a single large (4 mm) pellet in ohmic discharge has produced highly peaked profiles with nec(o) = 1.8 x 10^{14} cm^{-3}, n/sub e/(0) tau/sub E/(a) = 6.7 x 10^{13} cm^{-3} and n/sub D/(0)Ti(0)tau/sub E/(a) = 8.8 x 10^{13} cm^{-3} sKeV. Global confinement in these discharges approaches 0.45 seconds with a central density decay time of 2 seconds. Based on a neoclassical resistivity model and x-ray pulse-height analysis, zeff is <2 in both ohmic and beam-heated plasmas. The energy confinement properties of intermediate density (n/sub e/ (0) = 1 x 10^{14} cm^{-3}) full beam power (5.7 MW, 80 KVD°) discharge have been studied in detail using the TRANSP code. Although the global energy confinement (≈2 oums at IP = 2.2 MA) is comparable to gas-fueled discharges, the confinement in the central core is considerably longer and electron heat conduction losses are smaller.

49476 **(CONF-8510266—6) Results of pellet injection into ISX-B.** Schuresko, D.D. (Oak Ridge National Lab., TN (USA)). 1985. Contract AC05-84OR21400. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014236.

From International pellet fueling workshop; La Jolla, CA, USA (30 Oct 1985).

Improvements in plasma performance with pellet injection have been achieved in several tokamaks in recent experiments. On the Impurity Study Experiment (ISX-B), an increase in plasma energy by as much as 50%, has been observed following pellet injection. With 1.5-mm pellets, the value for tau/sub E/, the gross energy confinement time determined from β/sub equil/, has peaked at 1.7 times ISX-B scaling for n/sub e/ = 6 x 10^{13} cm^{-3} in both well-gettered and ungettered discharges. Following the peak, in the well-gettered shots tau/sub E/ decays to 1.2 times ISX-B scaling within 50 ms after pellet injection. In the ungettered discharges tau/sub E/ follows the Z-mode scaling that is appropriate to the plasma conditions (P/sub B/ = 1.7 MW, I/sub p/ = 180 kA). Thus, pellet injection in ISX-B shows energy confinement better than that for gas puffing in clean discharges and matches the Z-mode improvement obtained in ungettered discharges. Confinement improvement following pellet injection has also been acheived in smaller (a/sub p/ = 20 cm) plasmas with 1.0 mm diameter pellets. Comparisons of pellet shots which do show this improvement against pellet shots which do not show it was present.

49477 **(DOE/ER/53129—T1) Studies of plasma transport relevant to tandem mirrors. Final technical report, March 1, 1982-February 28, 1985.** Malmberg, J.H.; O'Neil, T.M. (California Univ., San Diego, La Jolla (USA). Dept. of Physics). 9 May 1985. Contract AT03-82ER53129. 36p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014714.

Experiments were performed on a pure electron plasma device. These plasmas are exceptionally well confined and their low background loss rate makes them well suited for controlled transport experiments. The confinement of electrons in these devices is similar to the confinement of ions in the central cell of a tandem mirror, i.e., the radial confinement is provided by a solenoidal magnetic field while the axial confinement is provided by electrostatic potentials. In addition, the various scaled parameters which are thought to determine the nature of the radial transport are similar for the two devices. However, the construction, operation, and understanding of the pure electron plasma is relatively simple compared to a tandem mirror machine. These considerations suggest that the pure electron plasma can be effectively employed to study the basic elements of the plasma transport theory used to describe radial particle losses in tandem mirrors.

49478 **(DOE/ER/53222—T1) High-beta plasma research. Task 1: high-beta tokamak research. Task 2: high-beta plasma theory. Annual progress report.** Navratil, G.A.; Chu, C.K. (Columbia Univ., New York (USA)). Jul 1986. Contract FG02-86ER53222. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013666.

A very brief summary of work on high-beta plasma theory and high-beta tokamak research is given. (MOW)

49479 **(DOE/ET/53088—2) Institute for Fusion Studies progress report, September 1, 1985-August 31, 1986.** (Texas Univ., Austin (USA). Inst. for Fusion Studies). Aug 1986. Contract FG05-80ET53088. 47p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014687.

A survey of the year's research reveals drift-wave simulation codes being applied to specific experimental issues, detailed profile effects being inferred from turbulence theory, and tokamak operating regimes being calculated from ballooning mode stability analysis. New theoretical approaches have also been developed, including generalized renormalization group methods, three-dimensional code development and the use of field-theoretic concepts, such as spontaneous symmetry breaking, to nonlinear tokamak dynamics. Studies during the past year concern tokamak edge turbulens, self-consistent magnetic stochasticity, and turbulence driven by the ion temperature gradient.

49480 **(DOE/ET/53088—230) Resistive fluid turbulence in diverted tokamaks and the edge transport barrier in H-mode plasmas.** Hahm, T.S.; Diamond, P.H. (Texas Univ., Austin (USA). Inst. for Fusion Studies). Jul 1986. Contract FG05-80ET53088. 34p. (IFSR—230). NTIS, PC A03/MF A01; GPO Dep. File Number DE86014389.

The thermal and particle diffusivities driven by resistive fluid turbulence in diverted tokamak edge plasmas are calculated. Diverted tokamak geometry is characterized by increased global shear near the separatrix and the tendency of field lines to linger near the x-point. For resistive fluid turbulence, the dominant effect is increased global shear, which causes a reduction in the effective step-size of the turbulent diffusion process and corresponding improvements in heat and particle confinement close to the separatrix. Stability of resistive kink modes resonant near separatrix is also ensured by the increased global shear. The relevance of these considerations to the L → H transition and to the edge transport barrier in H-mode plasmas is discussed.

49481 (DOE/ET/53088—237) Resonances in area-preserving maps. MacKay, R.S.; Meiss, J.D.; Percival, I.C. (Texas Univ., Austin (USA). Inst. for Fusion Studies). 12 Jun 1986. Contract FG05-80ET53088. 50p. (IFSR—237). NTIS, PC A03/MF A01; GPO Dep. File Number DE86014390.

A resonance for an area-preserving map is a region of the phase space delineated by "partial separatrices", which are curves formed from pieces of stable and unstable manifold of hyperbolic periodic points. Each resonance has a central periodic orbit, which may be elliptic or hyperbolic with reflection. The partial separatrices have turnstiles like the partial barriers formed from cantori. In this paper we show that the areas of the resonances, as well as the turnstile areas, can be obtained from the actions of homoclinic orbits. Numerical results on the scaling of areas of resonances with period and parameter are given. If there are no invariant circles, the resonances appear to fill the phase space completely. Indeed, we prove that the collection of all hyperbolic cantori together with their partial barriers occupies zero area.

49482 (DOE/ET/53088—239) Two- and three-dimensional magnetoinductive particle codes with guiding center electron motion. Geary, J.L.; Tajima, T.; Leboeuf, J.N.; Zaidman, E.G.; Han, J.H. (Texas Univ., Austin (USA). Inst. for Fusion Studies). Jul 1986. Contract FG05-80ET53088. 37p. (IFSR—239). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014391.

A magnetoinductive (Darwin) particle simulation model developed for examining low frequency plasma behavior with large time steps is presented. Electron motion perpendicular to the magnetic field is treated as massless keeping only the guiding center motion. Electron motion parallel to the magnetic field retains full inertial effects as does the ion motion. This model has been implemented in two and three dimensions. Computational tests of the equilibrium properties of the code are compared with linear theory and the fluctuation dissipation theorem. This code has been applied to the problems of Alfven wave resonance heating and twist-kink modes.

49483 (DOE/ET/53088—240) Axisymmetric MHD stable sloshing ion distributions. Berk, H.L.; Dominguez, N.; Roslyakov, G.V. (Texas Univ., Austin (USA). Inst. for Fusion Studies). Jul 1986. Contract FG05-80ET53088. 15p. (IFSR—240). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014392.

The MHD stability of a sloshing ion distribution is investigated in a symmetric mirror cell. Fokker-Planck calculations show that stable configurations are possible for ion injection energies that are at least 150 times greater than the electron temperture. Special axial magnetic field profiles are suggested to optimize the favorable MHD properties.

49484 (DOE/ET/53088—244) Limiter effects on scrape-off layer fluctuations and transport. Thayer, D.R.; Diamond, P.H.; Wootton, A.J. (Texas Univ., Austin (USA). Inst. for Fusion Studies). Aug 1986. Contract FG05-80ET53088. 11p. (IFSR—244). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014393.

An analysis is presented of scrape-off layer (SOL) fluctuations using a rippling mode or resistivity gradient driven turbulence (RGDT) calculation which incorporates the essential limiter boundary condition. The line-tying effects caused by a simple conducting poloidal limiter can lead to an order of magnitude reduction of the growth rate in the SOL region when parallel thermal conductivity is neglected. The basic effect of the limiter boundary condition can be understood by exploiting the conjugate relation between the parallel and radial mode widths, a consequence of magnetic shear. A reduction of the connection length, due to the limiter, implies an increase in the radial mode width. Assuming a conducting poloidal limiter with a large radial extent, the increased radial mode width causes an increase in thermal conduction damping which is sufficiently large enough so that the rippling mode is rendered stable for typical parallel thermal conductivities. We have also included the destabilizing effect of impurity radiative cooling in the RGDT analysis which leads to an increase of the growth rate, the saturation potential, and the diffusion coefficient by approximately 30% for typical parameters. Additionally, dissipative density gradient driven turbulence (DDGDT) is reconsidered as a viable model of SOL turbulence since it exhibits shorter toroidal mode widths than RGDT; thus, it is less sensitive to the limiter line-tying effect. Saturation level estimates for DDGDT with limiter effects are presented.

49485 (FRNC-TH—2125) Computation of large scale stochasticity and universality in Hamiltonian systems: application to plasma physics. Mohamed-Benkadda, M.S. (Paris-11 Univ., 91 - Orsay (France)). 1983. 142p. (In French). NTIS (US Sales Only), PC A07/MF A01. File Number DE86750852.

A renormalization group method allows to determine the threshold of large scale stochasticity in Hamiltonian systems with two degrees of freedom. A universality behavior is thus determined for these hamiltonian systems. This method is applied to some plasmas physics problems where the intrinsic stochasticity comes about.

49486 (GA-A—18227) Observation of Ti XXI line radiation in ECH plasmas. Lee, P.; Lieber, A.J.; Pradhan, A.K.; Yueming, X. (GA Technologies, Inc., San Diego, CA (USA); Colorado Univ., Boulder (USA)). May 1986. Contract FG02-84ER53189;AC03-84ER51044. 20p. (CONF-8511131—6). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014034.

From 5. international workshop on electron cyclotron emission and electron cyclotron heating; San Diego, CA, USA (9 Nov 1985).

Helium-like titanium line radiation in the x-ray region from 2.60 to 2.64 A has been measured with a high resolution spectrograph ($\lambda/\Delta\lambda > 19{,}000$) during electron cyclotron heating (ECH) experiments on the Doublet III tokamak. The intensity of the resonance line (i.e., $1s^2\ ^1S_0$ - $1s2p\ ^1P_1$) is found to be much more sensitive to the applied ECH power than the intensities of the satellite lines. A qualitative picture which accounts for the observed line intensities is the presence of non-Maxwellian electrons in the ECH plasma.

49487 (GA-A—18454) Model for divertor function in H-mode onset and proposal for H-mode operation with the island divertor. Ohyabu, N.; deGrassie, J.S.; Evans, T.E. (GA Technologies, Inc., San Diego, CA (USA)). Jul 1986. Contract AC03-84ER53158. 22p. (CONF-860522—20). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014028.

From 7. international conference on plasma surface interactions in controlled fusion devices; Princeton, NJ, USA (5 May 1986).

We propose that the main function of the divertor configuration in the H-mode mechanism is temporary storage of the effluxing particles for a time longer than the edge energy confinement time. This temporary storage enables the edge temperature to transiently increase above a threshold temperature necessary for the H-mode transition. This model qualitatively explains the superior H-mode regime in mechanically closed poloidal divertors and opens the possibility that the same result could be achieved using the resonant island divertor.

49488 **(IPPCZ—245) On the ponderomotive effects at the lower hybrid waves excitation.** Petrzilka, V.A.; Klima, R.; Pavlo, P. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Jun 1984. 13p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703128.

Due to ponderomotive density modulations at the plasma edge the propagation of the lower hybrid primary wave changes. The third spatial harmonic wave is generated. The nonlinearities in question do not modify the directionality of the primary wave. The directionality of the third harmonic wave inside the plasma approximately equals the directionality of the primary wave. The results are important for the high-frequency current drive in tokamaks.

49489 **(IPPJ—729) Collisional relaxation of electron tail distribution.** Yamagiwa, Mitsuru; Okamoto, Masao. (Nagoya Univ. (Japan). Inst. of Plasma Physics). May 1985. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703120.

Relaxation due to the Coulomb collisions of the electron velocity distribution function with a high energy tail is investigated in detail. In the course of the relaxation, a 'saddle' point can be created in velocity space owing to upsilon^{-3} dependence of the deflection rate and a positive slope or a 'dip' appears in the tail direction. The time evolution of the electron tail is studied analytically. A comparison is made with numerical results by using a Fokker-Planck code. Also discussed is the kinetic instability concerned with the positive slope during the relaxation.

49490 **(IPPJ—733) Computational study on excitation, propagation, and 3Ω sub(D)-heating due to the ion Bernstein wave.** Okada, H.; Abe, H.; Itatani, R.; Ono, M. (Nagoya Univ. (Japan). Inst. of Plasma Physics). May 1985. 61p. NTIS (US Sales Only), PC A04/MF A01. File Number DE86703123.

External excitation, propagation, and ion heating on the ion Bernstein wave (IBW) are studied for single ion and two-ion species plasmas using particle simulation. It is found that the value of ω/Ωsub(i) near the antenna position influences the excitation characteristics of the IBW. The wavelength and the group velocity of the propagating IBW agree well with those calculated from the linear dispersion relation. Corresponding to the experiment done at JIPP T-IIU, 3Ω sub(D) heating process in the plasma composed of deuterium-like and hydrogen-like ions is investigated. The wave energy is deposited into the bulk and tail of the deuterium-like ions due to the third harmonic cyclotron resonance and the bulk of the hydrogen-like ions due to the 3/2 Ω sub(H) cyclotron subharmonic resonance, respectively. Also discussed is the possibility that the heating efficiency may not depend on the concentration of the deuterium-like ion in the 3Ω sub(D) heating in the actual tokamak experiment.

49491 **(JET-R—86-02) Analyses of ICRF waves on JET plasmas.** Itoh, S.I.; Itoh, K.; Fukyama, A. (Commission of the European Communities, Abingdon (UK). JET Joint Undertaking; Hiroshima Univ. (Japan); Kyoto Univ. (Japan); Okayama Univ. (Japan)). 1986. 17p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703232.

Theoretical and computational study of ICRF waves has been carried out for JET plasmas. Present experimental parameters are analysed and some prediction studies for future experiments are carried out by combination use of two kinetic codes. The wave field is solved for obtaining the power deposition profile of each plasma species and the antenna impedance. Two-ion hybrid case is simulated. Strong minority heating in central core region is observed and the direct input to electrons is found at most to be 10% of the total absorption. However, for the higher temperature target plasma, the deposition profile to electrons becomes broader and off-central and its input reaches approx. 30%. Efficient non-central deposition to ions by combined use of NBI is also discussed. Global coupling study is also carried out for cold plasma with dampings.

49492 **(LA-UR—86-2381) Two-dimensional simulations of magnetically-driven instabilities.** Peterson, D.; Bowers, R.; Greene, A.E.; Brownell, J. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 26p. (CONF-860703—14). NTIS, PC A03/MF A01; GPO Dep. File Number DE86013846.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

A two-dimensional Eulerian MHD code is used to study the evolution of magnetically-driven instabilities in cylindrical geometry. The code incorporates an equation of state, resistivity, and radiative cooling model appropriate for an aluminum plasma. The simulations explore the effects of initial perturbations, electrical resistivity, and radiative cooling on the growth and saturation of the instabilities. Comparisons are made between the 2-D simulations, previous 1-D simulations, and results from the Pioneer experiments of the Los Alamos foil implosion program.

49493 **(LA-UR—86-2419) Liner compression of magnetically-confined, FRC plasmas.** Armstrong, W.T.; Morgan, J.A. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 10p. (CONF-860703—21). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013837.

From 4. international conference on megagauss magnetic-field generation and related topics; Santa Fe, NM, USA (14 Jul 1986).

A survey of fusion gain is made for a liner-compressed Field-Reversed Configuration (FRC), a closed-field-line magnetically confined plasma. The parameter space of initial liner velocity vs initial plasma density is examined for optimum thermonuclear conditions of the FRC at high compression (5 MG confining fields). The O-D survey model, an extension of a previous model, includes alpha heating, contaminant radiation losses and liner flux loss due to liner melting, in addition to plasma particle, energy and flux loss. The effects of speculated instabilities at high densities are discussed. The primary limits on fusion gain are found to be excessive plasma length changes and plasma/liner contact. Final optimized fusion conditions are density $\sim 10^{19}$ cm^{-3}, total temperature $\sim$ 20 keV and plasma energy $\sim$ 1 MJ. These optimized conditions correspond to higher initial density than in previous FRC/liner studies. Discussion of model constraints, experimental implications and a liner trial test are presented.

49494 **(ORNL/TM—9520) Experimental study of equilibrium in a bumpy torus.** Hiroe, S.; Cobble, J.A.; Colchin, R.J.; Chen, G.L.; Connor, K.A.; Goyer, J.R.; Solensten, L. (Oak Ridge National Lab., TN (USA). Fusion Energy Div.). Jun 1986. Contract AC05-84OR21400. 50p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014415.

Plasma equilibrium in the ELMO Bumpy Torus (EBT) was studied experimentally by measurements of the electrostatic potential structure. Before an electron tail population is formed, the electric field is found, roughly speaking, to be in the vertical direction. The appearance of a high-energy electron tail signals the formation of a negative potential well, and the potential contours start to nest. The potential contours are shifted inward with respect to the center of the conducting wall. The electric field between the plasma and the conducting wall forces the plasma inward, balancing the outward expansion force. This force balance provides a horizontal electric field that cancels the concentric radial electric field locally at the separatrix of the potential contour and leads to convective energy loss.

49495 **(ORNL/TM—9703) Effect of electric fields and fluctuations on confinement in a bumpy torus.** Hiroe, S.; Glowienka, J.C.; Hillis, D.L.; Wilgen, J.B.; Chen, G.L.; Cobble, J.A.; El-Nadi, A.M.; Goyer, J.R.; Solensten, L.; Casson, W.H. (Oak Ridge National Lab., TN (USA)). Jun 1986. Contract AC05-84OR21400. 44p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014413.

In order to understand the relationships between confinement and space potential (electric field) and between confinement and density fluctuations, plasma parameters in the ELMO Bumpy Torus Scale (EBT-S) have been measured systematically for a wide

range of operating conditions. Present EBT plasma parameters do not show a strong dependence on the potential profile, but rather exhibit a correlation with the fluctuations. The plasma pressure profile is found to be consistent with the profile anticipated on the basis of the flute stability criterion for a marginally stable plasma. For a heating power of 100 kW, the stored energy density is found to be restricted to the range between 4.5 x 10^{13} eV-cm^{-3} and 7 x 10^{13} eV-cm^{-3}. The lower limit remains constant regardless of heating power and pertains to plasmas lacking an equilibrium and/or stability. The upper limit increases with heating power and is found to result from the onset of instabilities. In between the two limits is a plasma that is in an equilibrium state and is marginally stable. Operational trajectories exist that take the EBT plasma from one limit to the other.

49496 **(RAL—85-022) Calculation of the opacity of hot dense plasmas.** Rose, S.J. (Rutherford Appleton Lab., Chilton (UK)). Mar 1985. 19p. NTIS (US Sales Only), PC A02/MF A01. File Number DE86703126.

A review of the calculation of the radiative opacity of hot dense material is presented. An attempt is made to describe some of the approximations and assumptions implicit in current calculations and to indicate areas in which improvements may be made.

49497 (UCID—20559-Vol.2, pp B.1-B.14) **MINIMARS interim report appendix halo model and computer code.** Santarius, J.F.; Barr, W.L.; Deng, B.Q.; Emmert, G.A. (Univ. of Wisconsin, Madison). Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

A tenuous, cool plasma called the halo shields the core plasma in a tandem mirror from neutral gas and impurities. The neutral particles are ionized and then pumped by the halo to the end tanks of the device, since flow of plasma along field lines is much faster than radial flow. Plasma reaching the end tank walls recombines, and the resulting neutral gas is vacuum pumped. The basic geometry of the MINIMARS halo is shown. For halo modeling purposes, the core plasma and cold gas regions may be treated as single radial zones leading to halo source and sink terms. The halo itself is differential into two major radial zones: halo scraper and halo dump. The halo scraper zone is defined by the radial distance required for the ion end plugging potential to drop to the central cell value, and thus have no effect on axial confinement; this distance is typically a sloshing plug ion Larmor diameter. The outer edge of the halo dump zone is defined by the last central cell flux tube to pass through the choke coil. This appendix will summarize the halo model that has been developed for MINIMARS and the methodology used in implementing that model as a computer code.

49498 **(UCLA/PPG—917) User's manual for FENAT: a two-dimensional multigroup diffusion theory Finite Element Neutral Atom Transport code.** Hasan, M.Z. (California Univ., Los Angeles (USA). Dept. of Mechanical, Aerospace and Nuclear Engineering). Jul 1986. Contract FG03-86ER52130. 80p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014407.

FENAT solves the two-dimensional energy dependent diffusion equation in Cartesian (X-Y) and cylindrical/toroidal (R-Z) coordinates. The boundary conditions allowed are: vacuum, reflection, albedo and surface source. The energy variable is treated by multigroup method. The resulting multigroup diffusion equation is solved by finite element Galerkin's method with triangular element discretization of the spatial domain. The algebraic matrix equation is solved by the direct method of Crout variation of Gauss' elimination. Dynamic memory allocation has been used so that the maximum problem size is limited by the size of active core storage of the machine. When necessary, the global matrix is stored in a binary disk file. FENAT is particularly suitable for the transport of neutral atoms in fusion plasmas.

49499 **Inner-shell x-ray line spectra of highly ionized titanium, chromium, iron, and nickel and their application to laboratory plasmas.** Lemen, J.R.; Phillips, K.J.H.; Doschek, G.A.; Cowan, R.D. (Mullard Space Science Laboratory, Holmbury St. Mary, Dorking, England). *Journal of Applied Physics;* 60: No. 6, 1960-1973(15 Sep 1986).

The intensities of x-ray lines due to inner-shell 1s-italic-2p-italic transitions in O I-, N I-, and C I-like ions of Ti XV—XVII, Cr XVII-XIX, Fe XIX-XXI, and Ni XXI-XXIII seen in tokamak plasmas are calculated. The lines are assumed to be formed by dielectronic recombination and inner-shell excitation. The present calculations are an extension of previous work for iron alone. The dielectronic contribution for iron was found to be more important, and this is true for the ions of titanium, chromium, and nickel considered here. The dielectronic rates were calculated using a suite of computer programs developed by one of us. The inner-shell contribution was estimated by van Regemorter's formula. The considered ion stages have two or more fine-structure levels in the ground configuration, which gives rise to a density dependence of both dielectronic and collision excitation mechanisms at densities between 10^{11} and 10^{16} cm^{-3}, a range suitable for tokamak plasmas. A means for determining the density of high-temperature plasmas is presented for when no other density diagnostics are available. Finally, the present calculations were applied to the problem of radial ion diffusion in tokamaks. Spectra were calculated by integrating along various lines of sight to simulate what might be observed by an actual spectrometer viewing a tokamak plasma.

49500 **Coupling of radiation and hydrodynamics in a Z-italic-pinch plasma.** Bailey, J.; Fisher, A.; Rostoker, N. (Department of Physics, University of California, Irvine, California 92717). *Journal of Applied Physics;* 60: No. 6, 1939-1945(15 Sep 1986).

The relationship between hydrodynamics and radiative energy loss from a gas puff Z-italic pinch was studied using helium, krypton, and a helium—krypton mixture. The results show that radiation cooling enables the magnetic field to compress the plasma to a higher electron density and a smaller final radius. The data are consistent with a simple model describing the thermalization of the plasma on the axis of the pinch. The spectrum of the krypton radiation from the mixture was harder than from the pure krypton pinch. This may be important for application of the Z-italic pinch as a radiation source.

49501 **Electrostatic ion probe for tokamak-plasma-edge diagnostic.** da Silva, R.P.; Nascimento, I.C.; da Cruz D.F. Jr.; Hershcovitch, A. (Instituto de Fi-acute-accentsica, Universidade de Sa-tildeo Paulo, C.P. 20516, 01498 Sa-tildeo Paulo, SP, Brazil). 57: No. 9, 2205-2209(Sep 1986).

An electrostatic probe for ion temperature and density measurements was built and tested in the scrape-off region of the TBR-1 small tokamak. The main parameters involved in the design and details of the construction of the probe are presented. The electron discrimination and the probe efficiency for ion detection were checked by measuring the probe current as a function of the collector retraction length for a constant voltage. The results for the ion temperature and density obtained from the characteristic curves are discussed and compared with previous measurements.

49502 **Study of the effects of photoelectron statistics on Thomson scattering data.** Hart, G.W.; Levinton, F.M.; McNeill, D.H. (Princeton Plasma Physics Laboratory, P. O. Box 451, Princeton, New Jersey 08544). 57: No. 9, 2218-2220(Sep 1986). Contract AC02-76CH03073.

A computer code has been developed which simulates a Thomson scattering measurement, from the counting statistics of the input channels through the mathematical analysis of the data. The scattered and background signals in each of the wavelength channels are assumed to obey Poisson statistics, and the spectral data are fitted to a Gaussian curve using a nonlinear least-squares fitting algorithm. This method goes beyond the usual calculation of the signal-to-noise ratio for the hardware and gives a quantitative measure of the effect of the noise on the final measurement. This method is applicable to Thomson scattering measurements in which the signal-to-noise ratio is low due to either low signal or high background. Thomson scattering data from the S-1 spheromak have been compared to this simulation, and they have been found to be in good agreement. This code has proven to be useful in assessing the effects of counting statistics relative to shot-to-shot variability in producing the observed spread in the data. It was also useful for designing improvements for the S-1 Thomson scattering system,

and this method would be applicable to any measurement affected by counting statistics.

49503 **Optical and UV/x-ray imaging diagnostics for imploding plasma experiments.** Lee, P.H.Y.; Price, R.H.; Reay, J.; Pecos, J.; Seagrave, J.; McGurn, J.; Cochrane, B.; Anderson, B. (Los Alamos National Laboratory, E-526, Los Alamos, New Mexico 87545). **57**: No. 9, 2227-2229(Sep 1986).

We report on a fast framing camera designed to image imploding foils driven by inductive storage drivers. The camera has several front ends which are disposable, they allow for imaging in either the visible, UV, or x-ray regions; it also has very large dynamic range which allows it to record sequences of events where the brightness changes by many orders of magnitude.

49504 **Faraday rotation in a multimode optical fiber in a fast rise-time, high magnetic field.** Wessel, F.J.; Wild, N.C.; Fisher, A.; Rahman, H.U.; Ron, A.; Felber, F.S. (JAYCOR, P. O. Box 85154, San Diego, California 92138-9259). **57**: No. 9, 2246-2249(Sep 1986).

A magneto-optic Faraday rotation diagnostic was implemented on a Z-italic-pinch driven flux-compression generator to measure line-averaged, megagauss, axial-magnetic fields up to 1.6 MG with rise times of 30 kG/ns. The axial-magnetic field rotated the plane of polarization of a 2-W argon laser beam in a 0.725-mm-diam, fused silica quartz fiber mounted coaxial with the Z-italic pinch. The rapid rise time and the high radiation environment presented by the Z-italic-pinch plasma caused a high-pressure impulse <100 kbar, to be coupled into the quartz-fiber probe disrupting the polarization-preserving properties of the fiber. The time scale for disruption was characteristic of a shock propagating radially through the fiber to its core. This paper will describe the response of the Faraday diagnostic under these conditions and present a simple model that describes the effects of fiber depolarization that is consistent with previous observations of stress-induced depolarization in optical fibers.

49505 **Comprehensive approach for diagnosing intense single-pulse microwave sources.** Earley, L.M.; Ballard, W.P.; Roose, L.D.; Wharton, C.B. (Microwave Physics Division, Sandia National Laboratories, Albuquerque, New Mexico 87185). **57**: No. 9, 2283-2293(Sep 1986). Contract AC04-76DP00789.

A comprehensive approach to developing intense pulse microwave diagnostics for measuring the performance of a high-power microwave source is presented. Both conventional and new diagnostic techniques were used. Hence all measurements were made in a redundant fashion allowing small error bars in the measured data. The output power was diagnosed using four methods: two transmitting—receiving systems, two circular waveguide directional couplers, calorimetry, and gaseous breakdown. The operating frequency was measured using three methods: bandpass filters, a heterodyne receiver, and a homodyne receiver. The diagnostics were evaluated by using a 12-vane S-band inverted relativistic magnetron operating at 1 MV, 0.31 T, and 5 kA which reliably produced 3.15-GHz microwaves at powers of approximately 100 MW for pulse lengths variable from 5 to 70 ns. The microwave power pulse had a rise time of approximately 2 ns.

49506 **Relativistic multiregion bounce-averaged Fokker—Planck code for mirror plasmas.** Matsuda, Y.; Stewart, J.J. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Journal of Computational Physics;* **66**: No. 1, 197-217(Sep 1986). Contract W-7405-ENG-48.

We have developed a unique Fokker—Planck code to study the physics of plasmas that are trapped in magnetic and potential wells of general shape on a collisional time scale. The code was designed primarily to apply to mirror machines, either a simple mirror or a tandem mirror. A plasma confined in a mirror machine generally consists of various groups of particles trapped magnetically and/or electrostatically depending on their energy, magnetic moment, and axial position. Characteristic features of such a plasma are: first, that the bounce times of trapped particles are much shorter than the collision times; and second, that particles trapped in different axial locations can have the same energy and magnetic moment. The former feature allows us to perform bounce-orbit averaging of the kinetic equation, and the latter feature indicates that the distribution function can be multivalued. The code solves a relativistic Fokker—Planck equation averaged over bounce orbits for all the trapped-particle groups. In addition to the Coulomb collision operator, the code includes a synchrotron radiation term, a quasilinear rf diffusion operator, and source and loss terms. The numerical method consists of a mapping technique and a Galerkin finite-element method. Example results using the code for electron-cyclotron resonant heating and neutral beam injection in a tandem mirror are also presented.

49507 **Time-implicit Monte Carlo Collision algorithm for particle-in-cell electron transport models.** Cranfill, C.W.; Brackbill, J.U.; Goldman, S.R. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Computational Physics;* **66**: No. 1, 239-249(Sep 1986).

A time-implicit Monte Carlo collision algorithm has been developed to allow particle-in-cell electron transport models to be applied to arbitrarily collisional systems. The algorithm is formulated for electrons moving in response to electric and magnetic accelerations and subject to collisional drag and scattering due to a background plasma. The correct fluid or streaming transport results are obtained in the respective limits of strongly or weakly collisional systems, and reasonable behavior is produced even for time-steps greatly exceeding the magnetic-gyration and collisional-scattering times.

49508 **3D nonlinear MHD calculations using implicit and explicit time integration schemes:.** Garcia, L.; Hicks, H.R.; Carreras, B.A.; Charlton, L.A.; Holmes, J.A. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). *Journal of Computational Physics;* **65**: No. 2, 253-272(Aug 1986). Contract AC05-84OR21400.

A computer code (KITE) that solves a reduced set of magnetohydrodynamic (MHD) equations with diamagnetic and thermal force effects included has been constructed. It can use two different time integration schemes. A mostly-explicit time integration scheme is shown to be efficient for the nonlinear phase of tearing mode turbulance where numerical stability demands a small timestep. However, for linear calculations, or nonlinear ones in which the level of turbulence is low, a mostly-implicit approach is seen to be more efficient. The two numerical schemes yield the same solution. Nonlinear MHD calculations in which the solutions are represented by a finite Fourier series allow one to study the dependence of the nonlinear solution on its permitted harmonic content. It is seen that for the 3-dimensional (3D), nonlinear, tearing mode disruption problem, the refinement of the solution by the addition of more modes leads to further destabilization. This contrasts to the rippling mode problem, in which the addition of modes is stabilizing. For the latter, a finite number of modes yields a converged solution that is a saturated state. This contrasting behavior reflects the basic physical mechanism of the nonlinear interaction in each case and not the particular numerical scheme used for the calculations.

49509 **Steady state compact toroidal plasma production.** Turner, W.C. (to Dept. of Energy, Washington, DC). US Patent 4,601,871. 22 Jul 1986. Filed date 17 May 1983. vp.

An apparatus is described for maintaining a field-reversed toroidally shaped plasma in a steady state mode consisting of: at least one magnetized coaxial plasma gun for forming a toroidal plasma the means having cylindrically symmetric solenoidal electrodes for generating a poloidal magnetic field; means for maintaining the radial equilibrium of the toroidal plasmas after formation, the means being operatively coupled to the plasma gun; and means for producing magnetic helicity being operatively connected to the electrodes so as to produce increasing magnetic helicity from magnetic flux between the electrodes.

49510 **Trapping of gun-injected plasma by a tokamak.** Leonard, A.W.; Dexter, R.N.; Sprott, J.C. (Department of Physics, University of Wisconsin, Madison, Wisconsin 53706). **57**: No. 3, 333-336(21 Jul 1986).

It is shown that a plasma produced by a Marshall gun can be injected into and trapped by a tokamak plasma. Gun injection raises the line-averaged density and peaks the density profile. Trapping of the gun-injected plasma is explainable in terms of a depolarization current mechanism.

49511 Self-consistent dynamolike activity in turbulent plasmas. Bhattacharjee, A.; Hameiri, E. (Department of Applied Physics, Columbia University, New York, New York 10027). 57: No. 2, 206-209(14 Jul 1986).

The evolution of turbulent plasmas is investigated within the framework of resistive magnetohydrodynamics. The functional form of the mean electric field is derived for fluctuations generated by tearing and resistive-interchange modes. It is shown that a bath of such local and global modes in pinches causes toroidal field reversal with finite pressure gradients in the plasma.

49512 Operation of a quasioptical electron cyclotron maser. Morse, E.C.; Pyle, R.V. (Lawrence Berkeley Lab., CA). 3: No. 3, 1239-1240(May-Jun 1985). Contract AC03-76SF00098.

The electron cyclotron maser, or gyrotron concept, has been developed to produce sources producing 200 kW at 28 GHz continuously, and higher power outputs and frequencies in pulsed mode. These sources have been useful in electron cyclotron resonance heating (ECRH) in magnetically confined fusion devices. However, high frequencies and higher power levels will be required in reactor-grade fusion plasmas, with likely requirements of 1.0 MW or more per source at 140 GHz.

49513 Renormalization and the breakup of magnetic surfaces. Greene, J.M. (GA Technologies Inc., San Diego, CA). pp 3-19 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Containment of field lines is a fundamental problem for magnetically controlled fusion. Transport along field lines is much faster than transport across field lines, so that containment of field lines is the first step toward containment of plasma in toroidal devices. Thus this problem has been studied for many years. The purpose of this chapter is to gather these results together and to set them into a fusion context. Sections 2 and 3 discuss the magnetic-containment problem. First, magnetic field lines in axisymmetric systems are treated, and then the effect of nonaxisymmetric perturbations is introduced. Period doubling in a magnetic-field-line context is discussed in Section 4, primarily as an introduction to renormalization in such systems. The breakup of magnetic surfaces is treated in Section 5 and Section 6 contains conclusions.

49514 Long-time correlations in stochastic systems. Karney, C.F.F. (Plasma Physics Lab., Princeton Univ., Princeton, NJ). pp 33-42 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

In recent years there has been considerable interest in understanding the motion in Hamiltonian systems when phase space is divided into stochastic and integrable regions. This paper studies one aspect of this problem, namely, the motion of trajectories in the stochastic sea when there is a small island present. The results how that the particle can be stuck close to the island for very long times. For the standard mapping, where accelerator modes are possible, it appears that the mean squared displacement of particles in the stochastic sea may increase faster than linearly with time indicating nondiffusive behavior.

49515 Magnetic field lines, Hamiltonian mechanics, and symmetries and invariants. Littlejohn, R.G. (Dept. of Physics, Univ. of California, Los Angeles, CA). pp 43-50 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

It is clear that the theory of maps is still generating a great deal of interest in the plasma-physics community. It seems that many people got interested in map theory in the first place by tracing magnetic field lines around tokamaks and stellarators, so perhaps it is appropriate here to note more about the connection between magnetic field lines and Hamiltonian mechanics. The author tries to give a kind of unified and general treatment of field-line flow as a Hamiltonian system, which should pull all these threads together. It turns out that the way to do this is to modify somewhat both the usual description of magnetic-field-line flow and that of Hamiltonian mechanics. In the case of Hamiltonian mechanics, the modification consists of using noncanonical coordinates in phase space. From a mathematical standpoint, this is a rather simple thing to do. Mathematicians tend to eschew coordinates anyway. but it is a step with a number of useful consequences for plasma physics. In addition to magnetic-field-line flow, the subject of this chapter, there are also guiding-center theory and the subject of gyrokinetic equations, which are clarified by the use of noncanonical coordinates.

49516 Searching for integrable systems. Cary, J.R. (Inst. for Fusion Studies, Univ. of Texas, Austin, TX). pp 51-56 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Lack of integrability leads to undesirable consequences in a number of physical systems. The lack of integrability of the magnetic field leads to enhanced particle transport in stellarators and tokamaks with tearing-mode turbulence. Limitations of the luminosity of colliding beams may be due to the onset of stochasticity. Enhanced radial transport in mirror machines caused by the lack of integrability and/or the presence of resonances may be a significant problem in future devices. To improve such systems one needs a systematic method for finding integrable systems. Of course, it is easy to find integrable systems if no restrictions are imposed; textbooks are full of such examples. The problem is to find integrable systems given a set of constraints. An example of this type of problem is that of finding integrable vacuum magnetic fields with rotational transform. The solution to this problem is relevant to the magnetic-confinement program.

49517 Resonance behavior of the perturbed Toda lattice. deFainchtein, R.; Reichl, L.E. (Center for Studies in Statistical Mechanics, Univ. of Texas, Austin, TX). pp 65-78 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Numerical data are presented to supplement previous theoretical work on dynamic external-field resonance behavior and chaos in the two-particle Toda lattice.

49518 Hamilton's principle and the splitting of periodic orbits. Schmidt, G. (Stevens Inst. of Tech., Hoboken, NJ). pp 57-64 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

It is shown that bifurcation of periodic orbits, and orbit splitting in general, are closely related to the development of new saddle-point directions of the Lagrangian integral I_1. Critical parameter values for orbit-splitting can be found by looking at zeros of the second variation of I_1 over a suitably chosen function space of periodic functions. I_1 is a minimum for unstable periodic orbits and KAM trajectories. The rapid convergence of this method for finding bifurcations is illustrated with the example of a particle in a standing wave field.

49519 Progress in computing Lyapunov exponents from experimental data. Wolf, A.; Swift, J. (Dept. of Physics, Univ. of Texas, Austin, TX). pp 111-125 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Of the many diagnostics proposed for deterministic chaotic systems, the spectrum of Lyapunov exponents appears to be the most physically relevant. A well-known technique for computing these exponents for systems defined by sets of differential equations may be reformulated for use with experimental data. Here the authors discuss the calculation of the largest positive exponent with his new technique and compare it to the use of an underlying one-dimensional map to compute the same exponent.

49520 Kinetic description of a chaotic motion in a classical conservative system with two degrees of freedom. Petrosky, T.Y. (Center for Studies in Statistical Mechanics, Univ. of Texas, Austin, TX). pp 189-208 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Motion of an elastic pendulum in the vicinity of unperturbed separatrix has been investigated by a kinetic description of nonequilibrium statistical mechanics. New canonical variables of the pendulum, which are well-defined and continuous at the separatrix, have been introduced. A kinetic equation of the Fokker-Planck type for the momentum distribution function has been derived from basic principles in the weak coupling limit. This equation gives the Arnol'd Chirikov diffusion coefficient of the energy of the unperturbed pendulum. In higher-order approximation in a coupling constant, the existence of a logarithmic singularity is pointed out.

49521 Collisional diffusion in a torus with imperfect magnetic surfaces. White, R.B. (Plasma Physics Lab., Princeton Univ., Princeton, NJ). pp 209-224 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

A Hamiltonian formulation of the guiding center drift equations is used to investigate the modification of neoclassical diffusion for low collisionality in a toroidal magnetic field with partially destroyed magnetic surfaces. The magnetic field is assumed to be given by the small perturbation of an axisymmetric system. The results are applicable to particle diffusion in realistic confinement systems, midway between axisymmetric and purely stochastic ones. Significant enhancement of electron diffusion over neoclassical rates is found. This increase can be accounted for by the contributions due to the first few island chains in the Fibonacci sequence generated by the zero-order island and by associated stochastic domains.

49522 Impact of clumps on plasma stability and the nature of turbulence in a saturated state. Terry, P.W.; Diamond, P.H. (Inst. for Fusion Studies, The Univ. of Texas at Austin, Austin, TX). pp 335-351 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Phase-space density granulations (clumps) are studied using the theory of two-point phase-space density correlation. A novel mechanism of extraction of expansion-free energy is described. This mechanism affects questions pertaining to nonlinear stability. Theories for two-point correlation for the universal mode in a slab geometry with shear and trapped electrons in toroidal geometry are discussed. Results are present that show destabilization of the universal mode and enhancement of the trapped electron growth rate. An analytic formula for the width of the frequency spectrum is obtained. By specifying the collective resonance damping mechanism, the wavenumber spectrum is also calculated. A formula for energy flux illustrates the impact of clumps on transport and energy confinement.

49523 Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984). 361p.

This book examines the statistical properties of nonlinear dynamical systems in relation to plasma confinement. Topics considered include magnetic surfaces, stochastic systems, magnetic field lines, Hamiltonian mechanics, resonance, solitons, fractal basin boundaries, kinetic theory, drift wave turbulence, and clumps in plasma physics.

49524 Fractal basin boundaries in nonlinear dynamical systems. Grebogi, C.; McDonald, S.W.; Oh, E. ; Yorke, J.A. (Univ. of Maryland, Coll. Park, MD). pp 127-130 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

The structure of the boundaries separating basins of attraction for different attractors is investigated. To illustrate the possibility of fractal basin boundaries in the simplest possible context, and also to facilitate an analytical calculation, the authors consider a particular two-dimensional noninvertible map. While this example may appear to be somewhat contrived, they emphasize that the phenomena found have also been demonstrated in more-general examples. The fractal basin boundaries described here are nondifferentiable curves.

49525 Kinetic theory of fluctuations in fluids far from equilibrium. Cohen, E.G.D.; Kirkpatrick, T.R. (Inst. for Physical Science and Tech., Univ. of Maryland, Coll. Park, MD). pp 171-187 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

An outline is given of the kinetic theory of a convective instability in a fluid, and the density and velocity fluctuations near it. The first convective instability in the Rayleigh-Benard cell is considered. Results are presented for fluids of arbitrary density. The singular behavior of the fluctuations below and above the instability point and their experimental detection are discussed.

49526 Evolution from coherence to turbulence in plasmas. Wong, A.Y.; Cheung, P.Y.; Tanikawa, T. (Dept. of Physics, Univ. of California, Los Angeles, CA). pp 131-153 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Highly monochromatic plasma waves are observed to evolve into turbulent spectra with spreads in frequencies and wavenumbers. In the weakly turbulent regime parametric decay and mode-coupling processes account for the spreading in frequency and wavenumber spectra. Certain parametric processes satisfying linear dispersion relations exhibit period doubling as a route to turbulence. The turbulent spectra are a result of sharp spatial inhomogeneities (cavitons) and the interactions between waves trapped inside cavitons. The relationship between caviton collapse and the formation of phase-space granulations is described.

49527 Coherence in chaos and the Zakharov model. Doolen, G.D.; DuBois, D.F.; Rose, H.A.; Hafizi, B. (Science Applications Inc., Plasma Research Inst., Boulder, CO). pp 155-167 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

The chaotic nature of "caviton turbulence" is studied in one-dimensional many-Fourier mode numerical simulations of the dissipative Zakharov equations in which the system is driven to modulational instability by energy injection into long-wavelength modes. Just above this instability threshold the system evolves, with hysteresis, into a variety of stable spacetime patterns of cavitons. For stronger driving the system becomes chaotic along various routes; the cavitons remain quite coherent with lifetimes long compared to the shortest Lyapunov time.

49528 Statistical description of drift wave turbulence. Horton, W. Jr. (Inst. for Fusion Studies, Univ. of Texas at Austin, Austin, TX). pp 253-271 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Dissipative drift wave fluctuations are studied with the Terry-Horton nonlinear drift wave model. The $k\omega$ spectral characteristics of the fluctuations are parametrized in terms of the nonlinear frequency ω/subk/ and line width ν/subk/ from computer simulations and the renormalized wave-kinetic equation. The probability distributions of the fluctuations are analyzed to assess the validity of the quasinormal approximation made in the closure of the hierarchy of correlations in statistical turbulence theory.

49529 Solitons in turbulent flow. Meiss, J.D. (Inst. for Fusion Studies, The Univ. of Texas, Austin, TX). pp 273-284 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

In this chapter the author discusses the connection between two seemingly dissimilar concepts: turbulence and coherence. Historically, turbulent flow has been characterized by extreme incoherence or randomness, the most successful theoretical treatments assuming quasi-Gaussianity. At the opposite end of the spectrum of

fluid motion are laminar flows such as isolated vortices, which they refer to as coherent structures. Perhaps the most coherent structure is the soliton, which maintains its integrity as a manifestation of the integrability of the field theory that describes it.

49530 **Topics in the theory of statistical closure approximations for plasma physics.** Krommes, J.A. (Princeton Univ., Plasma Physics Lab., Princeton, NJ). pp 241-252 of Statistical physics and chaos in fusion plasmas. Horton, C.W.; Reichl, L.E. New York, NY; John Wiley & Sons, Inc. (1984).

Recent advances and directions in the theory of statistical descriptions for plasmas are discussed. It would appear that analytical connections are beginning to be made between statistical closures and the impressive body of recent advances in nonlinear dynamics. Furthermore, the state of the art in numerical computation has advanced to the point where nontrivial tests of such closures as the direct-interaction approximation can be undertaken for situations of interest to applications-oriented plasma physics.

7002 Fusion Power Plant Technology

REFER ALSO TO CITATION(S) 47934, 47935, 48250, 48267, 48367, 49096, 49220, 49221, 49222, 49262, 49263, 49264, 49265, 49266, 49305, 49475, 49476, 49497

49531 **(ANL/FPP/TM—205) Liquid-metal flow in a thin conducting pipe near the end of a region of uniform magnetic field.** Walker, J.S. (Argonne National Lab., IL (USA); Illinois Univ., Urbana (USA). Dept. of Theoretical and Applied Mechanics). Apr 1986. Contract W-31-109-ENG-38. 42p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86015006.

This paper treats the liquid-metal flow in a straight circular pipe with a thin metal wall. A strong magnetic field is applied by a magnet with parallel poles that end abruptly. In the plane midway between the magnet poles: (1) far upstream, the flow is uniform, fully developed flow in a uniform magnetic field; (2) as the flow enters the non-uniform magnetic field near the end of the magnet, the flow moves away from the central part of the pipe and becomes concentrated as two jets near the points where the magnetic field is tangent to the pipe wall; (3) further downstream where the magnetic field strength is 0(c/sup 1/6/) compared to its value upstream, the flow migrates from these jets back toward a uniform flow distributed over the entire pipe cross section. Here, c is the wall conductance ratio, which is assumed to be small. The analysis also applies to flow into the magnetic field, because inertial effects and induced magnetic fields are neglected. There are circulations of electric current in planes parallel to the magnet poles. These currents produce a pressure drop in addition to that for two fully developed flows, one in a uniform magnetic field and one in no magnetic field, joined at the end of the magnet.

49532 **(BNL—38384) Muon sticking factor in muon catalyzed fusion and the other aspect of this fusion process.** Takahashi, H. (Brookhaven National Lab., Upton, NY (USA)). 1986. Contract AC02-76CH00016. 7p. (CONF-860601—7). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014168.

From 4. international conference on emerging nuclear energy systems; Madrid, Spain (30 Jun 1986).

The effect of resonance nuclear fusion reaction on the initial muon sticking factor is formulated. The analysis shows that it is very sensitive to the resonance parameter, and the factor calculated, using the molecular wave function obtained by the Diffusion Monte Carlo method, is 0.1 +- 0.01 for the presently evaluated resonance parameter. The analysis of the multistep excitation effect on the reactivation factor shows that the effect is not so large, and the analysis of muonic x-ray spectra of μ^3He from Pμd and dμd fusions is in good agreement with the values measured by Bossy et al.

49533 **(CLM-R—254) Demo tokamak reactor. Aspects of the conceptual design.** Cooke, P.I.H.; Reynolds, P. (UKAEA Culham Lab., Abingdon). Aug 1985. 266p. H.M. Stationery Office, London, price Pound 12.00.

Some of the more important aspects of the design of a demonstration tokamak reactor are discussed with particular emphasis on the design of the tritium breeding blanket and its associated components. Alternative blanket designs employing ceramic and liquid breeding materials are presented. Both conform to the requirements of a commercial reactor in having a global tritium breeding ratio greater than unity and an outlet coolant temperature high enough for efficient electricity generation. Solutions to the problems of heat loading and plasma erosion of the first wall and divertor plates are proposed.

49534 **(CLM-R—255) Development of austenitic stainless steels as low-activity structural materials for fusion reactors.** Bott, A.H.; Pickering, F.B.; Butterworth, G.J. (Commission of the European Communities, Abingdon (UK). JET Joint Undertaking). Aug 1985. 55p. H.M. Stationery Office, London, price Pound 5.00.

A study based on published information has been performed to examine the feasibility of designing low-activity austenitic stainless steels to replace the conventional steels AISI 316, 320 and 321 and the proprietary steel FV548 for use as first wall and blanket materials in a fusion reactor. The alternative compositions have been chosen subject to the condition that the contact gamma ray dose rate associated with the induced radioactivity does not exceed 2.5 x 10^{-8} Gyh^{-1} after a decay period of 100 years. This limit should permit relatively safe handling of discarded components for subsequent recycling. The approach adopted in designing the alternative alloys involved the replacement of the high-activity elements that occur in conventional stainless steels with elements exhibiting low residual dose rates, while at the same time retaining the fully austenitic structure and equivalent transformation characteristics and mechanical properties. The major replacements suggested were Ni by Mn-N combinations, Mo by W, Tb by Ta.

49535 **(CLM-R—258) Bundle divertor. Compositional control and exhaust in tokamak experiments and the NET reactor.** Harbour, P.J.; Johnson, P.C. (UKAEA Culham Lab., Abingdon). Feb 1985. 63p. H.M. Stationery Office, London price Pound 7.00.

The status of knowledge of tokamak discharges with a bundle divertor is described, in particular concerning the effectiveness of a bundle divertor for compositional control and exhaust, first for tokamak experiments, then for the Next European Torus (NET). Magnetic geometry, results from the DITE tokamak experiment, modelling of bundle divertors; assessment of divertor performance, extrapolation from the DITE experiment and from modelling to NET, and comments on reactor bundle divertor designs, are all discussed.

49538 **(CONF-860551—8) Review of tokamak power reactor and blanket designs in the United States.** Baker, C.; Brooks, J.; Ehst, D.; Gohar, Y.; Smith, D.; Sze, D. (Argonne National Lab., IL (USA)). 1986. Contract W-31109-ENG-38. 15p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014593.

From Technical meeting and workshop on fusion reactor design and technology; Yalta, USSR (26 May 1986).

The last major conceptual design study of a tokamak power reactor in the United States was STARFIRE which was carried out in 1979-1980. Since that time US studies have concentrated on engineering test reactors, demonstration reactors, parametric systems studies, scoping studies, and studies of selected critical issues such as pulsed vs. steady-state operation and blanket requirements. During this period, there have been many advancements in tokamak physics and reactor technology, and there has also been a recognition that it is desirable to improve the tokamak concept as a commercial power reactor candidate. During 1984-1985 several organizations participated in the Tokamak Power Systems Study (TPSS) with the objective of developing ideas for improving the tokamak as a power reactor. Also, the US completed a comprehensive Blanket Comparison and Selection Study which formed the basis for further studies on improved blankets for fusion reactors.

49537 (CONF-860652—12) Overview of the Compact Ignition Tokamak. Flanagan, C.A. (Oak Ridge National Lab., TN (USA). Fusion Engineering Design Center). 1986. Contract AC05-84OR21400. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013258.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

The mission of CIT is to realize, study, and optimize fully ignited plasma discharges. The physics requirements have been established to provide reasonable assurance that the mission will be achieved: (1) plasma confinement guidelines consider all present scaling laws; ohmic, auxiliary heated L-mode, auxiliary heated H-mode, (2) figure-of-merit established: $X = aB/q$; this is proportional to ignition margin; X must be >25, (3) burn pulse duration set at ten times tau-E; an additional two times tau-E specified to heat to ignition, and (4) capability to operate both in limiter and divertor mode.

49538 (CONF-860652—20) IPFR: Integrated Pool Fusion Reactor concept. Sze, D.K. (Argonne National Lab., IL (USA). Fusion Power Program). 1986. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014620.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

The IPFR (Integrated Pool Fusion Reactor) concept is to place a fusion reactor into a pool of molten Flibe. The Flibe will serve the multiple functions of breeding, cooling, shielding, and moderating. Therefore, the only structural material between the superconducting magnets and the plasma is the first wall. The first wall is a stand-alone structure with no coolant connection and is cooled by Flibe at the atmospheric pressure. There is also no need of the primary coolant loop. The design is expected to improve the safety, reliability, and maintainability aspects of the fusion system.

49539 (CONF-860652—21) Status of fusion reactor blanket design. Smith, D.L.; Sze, D.K. (Argonne National Lab., IL (USA)). Feb 1986. Contract W-31-109-ENG-38. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014527.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

The recent Blanket Comparison and Selection Study (BCSS), which was a comprehensive evaluation of fusion reactor blanket design and the status of blanket technology, serves as an excellent basis for further development of blanket technology. This study provided an evaluation of over 130 blanket concepts for the reference case of electric power producing, DT fueled reactors in both Tokamak and Tandem Mirror (TMR) configurations. Based on a specific set of reactor operating parameters, the current understanding of materials and blanket technology, and a uniform evaluation methodology developed as part of the study, a limited number of concepts were identified that offer the greatest potential for making fusion an attractive energy source.

49540 (CONF-860652—22) Tritium system for a tokamak reactor with a self-pumped limiter. Hassanein, A.M.; Sze, D.K. (Argonne National Lab., IL (USA). Fusion Power Program). 1986. Contract W-31-109-ENG-38. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014554.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

The self-pumping concept was proposed as a means of simplifying the impurity control system in a fusion reactor. The idea is to remove helium in-situ by trapping in freshly deposited metal surface layers of a limiter or divertor. Trapping material is added to the plasma scrape-off or edge region where it is transported to the wall. Some of the key issues for this concept are the tritium inventory in the trapping material and the permeation of protium and recycling of tritium. These quantities are shown to be acceptable for the reference design. The tritium issues for a helium-cooled solid breeder reactor design with vanadium alloy as a structural material are also examined. Models are presented for tritium permeation and inventory calculation for structure materials with the effect of a thin layer of coating material.

49541 (CONF-860652—23) Fusion blanket inherent safety assessment. Sze, D.K.; Jung, J.; Cheng, E.T. (Argonne National Lab., IL (USA). Fusion Power Program; GA Technologies, Inc., San Diego, CA (USA)). 1986. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014553.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

The inherent safety aspect of TPSS reactor blankets has been investigated. The idea is to design the blanket so safe that cost savings can be realized such as through non-nuclear grading construction. If the blanket materials are carefully selected, inherent safety is feasible for fusion reactor blankets up to 5 to 10 MW/m^2 neutron wall loading.

49542 (CONF-8510266—1) Electron beam rocket pellet accelerator. Foster, C.A.; Menon, M.M. (Oak Ridge National Lab., TN (USA)). 1985. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014230.

From International pellet fueling workshop; La Jolla, CA, USA (30 Oct 1985).

Viewgraphs from the presentation are given. (MOW)

49543 (CONF-8510266—2) Centrifuge injector development at Oak Ridge National Laboratory. Foster, C.A. (Oak Ridge National Lab., TN (USA)). 1985. Contract AC05-84OR21400. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014229.

From International pellet fueling workshop; La Jolla, CA, USA (30 Oct 1985).

Viewgraphs from this presentation are given. The centrifugal injector and its use on the Doublet 3 are described. (MOW)

49544 (CONF-8510266—3) Operation of the repeating pneumatic injector on TFTR and design of an 8-shot deuterium pellet injector. Combs, S.K.; Milora, S.L.; Foust, C.R.; Baylor, L.R.; Burris, R.D.; Fisher, P.W.; Lunsford, R.V.; Sparks, D.O.; Stewart, K.A.; Wysor, R.B. (Oak Ridge National Lab., TN (USA). Fusion Energy Div.; Princeton Univ., NJ (USA). Plasma Physics Lab.). 1985. Contract AC05-84OR21400. 26p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014222.

From International pellet fueling workshop; La Jolla, CA, USA (30 Oct 1985).

The repeating pneumatic hydrogen pellet injector, which was developed at the Oak Ridge National Laboratory (ORNL), has been installed and operated on the Tokamak Fusion Test Reactor (TFTR). The injector combines high-speed extruder and pneumatic acceleration technologies to propel frozen hydrogen isotope pellets repetitively at high speeds. The pellets are transported to the plasma in an injection line that also serves to minimize the gas loading on the torus; the injection line incorporates a fast shutter valve and two stages of guide tubes with intermediate vacuum pumping stations. A remote, stand-alone control and data acquisition system is used for injector and vacuum system operation. In early pellet fueling experiments on TFTR, the injector has been used to deliver deuterium pellets at speeds ranging from 1.0 to 1.5 km/s into plasma discharges. First, single large (nominal 4-mm-dia) pellets provided high densities in TFTR (1.8×10^{14} cm^{-3} on axis); after conversion to smaller (nominal 2.7-mm-dia) pellets, up to five pellets were injected at 0.25-s intervals into a plasma discharge, giving a line-averaged density of 1×10^{14} cm^{-3}. Operating characteristics and performance of the injector in initial tests on TFTR are presented.

49545 (CONF-8510266—4) Continuous pellet fueling experiments on D-III. Foster, C.A.; Milora, S.L.; Attenberger, S.E.; Sengolu, S.; Nagami, M.; Stockdale, R.; Schissel, D.; Wojtowicz, S.; Blau, F.; Fairbanks, E. (Oak Ridge National Lab., TN (USA). Fusion Energy Div.; Japan Atomic Energy Research Inst., Tokyo; GA Technologies, Inc., San Diego, CA (USA)). 1985. Contract AC05-84OR21400. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014231.

From International pellet fueling workshop; La Jolla, CA, USA (30 Oct 1985).

A centrifuge pellet injector developed at ORNL was used to continuously fuel beam-heated limiter discharges in D-III. This injector was capable of producing and maintaining a high density neutral beam-heated plasma without auxilary gas fueling. Viewgraphs from the presentation are included.

49546 (CONF-8605139—3) Minimars maintenance. Spampinato, P.T. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86011758.

From Minimars review meeting; Toronto, Canada (20 May 1986).

Viewgraphs from the presentation are included. (MOW)

49547 (CONF-8606179—Vol.2) 1986 USSR-US Exchange II.4. Topical meeting: magnetic configurations, plasma equilibrium, and stability of stellarators. Volume II. US presentations. (Oak Ridge National Lab., TN (USA); Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.); Wisconsin Univ., Madison (USA)). 1986. Contract AC05-84OR21400. 272p. NTIS, PC A12/MF A01. File Number DE86014483.

From USSR/US exchange II: 4. topical meeting on magnetic configurations, plasma equilibrium and stability of stellarators; Oak Ridge, TN, USA (23 Jun 1986).

Separate abstracts were prepared for each of the included papers. (MOW)

49548 (DOE/ET/52025—T4) 3-D transient eddy current calculations for the Felix cylinder experiments. Davey, K.R. (Georgia Inst. of Tech., Atlanta (USA). Fusion Research Center). Jul 1986. Contract AS05-78ET52025. 56p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014753.

The three-dimensional eddy current transient field problem is formulated first using the U-V method. This method breaks the vector Helmholtz equation into two scalar Helmholtz equations. Null field integral equations and the appropriate boundary conditions germaine to the problem are used to set up an identification matrix which is independent of null field point locations. Embedded in the identification matrix are the unknown eigenvalues of the problem representing its impulse response in time. These eigenvalues are found by equating the determinant of the identification matrix to zero. The eigenvalues, which can be equated with temporal response, are found to be intimately linked to the initial forcing function which triggers the transient in question. When this initial forcing function is Fourier decomposed into its respective spatial harmonics, it is possible to associate with each Fourier component a unique eigenvalue by this technique. The true transient solution comes through a convolution of the impulse response so obtained with the particular external field decay governing the problem at hand. The technique is applied to the Felix medium cylinder and compared to data. A pseudoanalytic conformation of the eigenvalues so obtained is formulated to validate the procedure.

49549 (DOE/NBM—1053) Designer's guidebook for first wall/blanket/shield assembly, maintenance, and repair. (McDonnell Douglas Astronautics Co., St. Louis, MO (USA); Remote Technology Corp., Oak Ridge, TN (USA)). 30 Dec 1983. Contract W-31-109-ENG-38. 345p. NTIS, PC A15/MF A01; 1; GPO Dep. File Number DE86014786.

This is the initial issue of the guidebook. Since a guidebook of this type must incorporate information concerning a wide range of subjects, much additional data will eventually be included. The guidebook will document, in summary and easily referenceable form, data, designs, design concepts, design guidelines and background information useful to the FWBS and to the Maintenance System designer. In providing guidelines for the AMR of the FWBS, the guidebook must, of necessity, include guidelines for all aspects of maintenance associated with the FWBS. These include most maintenance operations within the reactor room necessary to gain access, identify faults, and handle equipment related to FWBS maintenance. In addition, the guidelines include those required to define facility requirements for handling and repair of FWBS and related reactor components external to the reactor room. Particular emphasis is given to remote maintenance design and operations.

49550 (DOE/NBM—6012187) Magnetic fusion energy. Disaster operation procedures. (Lawrence Livermore National Lab., CA (USA)). Jun 1986. Contract W-7405-ENG-48. 15p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86012187.

In a major disaster such as an earthquake, toxic chemical release, or fire, these Disaster Operations Procedures can be used, in combination with good judgment, to minimize the risk of injury to personnel and of property damage in our laboratory, shop, and office areas. These emergency procedures apply to all personnel working within MFE/Zone-11 area including visitors, program contract personnel, and construction contract personnel.

49551 (EGG-M—01286) Common views of potentially attractive fusion concepts. Piet, S.J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1986. Contract AC07-76ID01570. 7p. (CONF-860652—11). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013489.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

Fusion is viewed through three windows to help determine what constitutes a very attractive fusion concept. These windows are economics, maintenance and reliability, and safety and environment. Achievement of many desired features cannot yet be quantified. Although these differing perspectives can lead to some conflicting desires, five common desired features are apparent - (a) minimum failure rates, (b) minimum failure effects, (c) minimum complexity, (d) minimum short-term radioactivity, and (e) maximum mass power density. Some innovative fusion concepts are briefly examined in the light of these commonalities.

49552 (GA-A—18455) Experiments to test an intra-island scoop limiter on TEXT. Evans, T.E.; deGrassie, J.S.; Jackson, G.L.; Ohyabu, N.; Karger, F.; Haas, G. (GA Technologies, Inc., San Diego, CA (USA); Texas Univ., Austin (USA). Fusion Research Center; Association Euratom-Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). Jul 1986. Contract AC03-84ER53158. 24p. (CONF-860522—19). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014030.

From 7. international conference on plasma surface interactions in controlled fusion devices; Princeton, NJ, USA (5 May 1986).

An instrumented scoop limiter probe is being operated on TEXT to test the concept of limiter cooling and improved particle removal efficiencies using an externally-applied resonant magnetic field perturbation (the resonant helical divertor concept). Cooling of the limiter face has been demonstrated for limiter positions ranging from γ/sub L/ = 29.0 cm inward to γ/sub L/ = 25.5 cm (the TEXT primary poloidal hoop limiter radius γ/sub a/ = 27.0 cm). Pressure rises in the limiter throat of approximately 40% are observed under optimized conditions. Interchangeable limiter heads with thicknesses of 1.0 cm and 0.3 cm have been used to examine particle ducting into the scoop aperture. Experimental results are discussed along with observations of the limiter floating potential, H/sub α/ recycling emissions, pressure measurements, and edge density and temperature measurements.

49553 (INIS-BR—492, pp 265-277) Neutronic comparative study of some structural materials for fusion reactors. Santos, R. dos; Azevedo, E.M. de; Silva, R.C.O. da. (Centro de Informacoes Nucleares, Rio de Janeiro, Brazil). 1985. (In Portuguese). NTIS (US Sales Only), PC A99/MF A01. File Number DE86703268. (CONF-8504255—).

From 5. national meeting of reactor physics; Rio de Janeiro, RJ, Brazil (10 Apr 1985).

Calculations of tritium regeneration, heat generation and gas production in function of the following structural materials; niobium, vanadium, molybdenum, titanium and zirconium were made for the neutronic design of fusion reactor blankets. ANISN, DLC-37F and MACKLIB-IV were utilized.

49554 **(IPPJ-DT—115) Study meeting on 'criteria for materials of nuclear fusion reactors'.** (Nagoya Univ. (Japan). Inst. of Plasma Physics). Oct 1984. 103p. (In Japanese). (CONF-8403241—). NTIS (US Sales Only), PC A06/MF A01. File Number DE86703134.

From Study meeting on criteria for materials of nuclear fusion reactors; Nagoya, Japan (1 Mar 1984).

This study meeting was held on March 1 and 2, 1984, at the Institute of Plasma Physics, Nagoya University. Recently, the problems required for the materials of nuclear fusion reactors have become considerably clear. The problem of the high concentration damage due to 14 MeV neutrons and the problem of surface materials have been well known from the beginning, but moreover, the radioactivation of materials, the problem of safety, and the feasibility of remote operation related to it have become urgent problems. Besides, the plan of large scale facilities as the means of promoting research is one of the important themes. The research on materials must take part in the whole technological problems which enable the construction of actual nuclear fusion devices. This study meeting was held as a part of the R project of the Institute of Plasma Physics, Nagoya University, but it aimed at grasping the present status and discussing the future perspective of the materials of nuclear fusion reactors, and examining the criteria for nuclear fusion materials. The gists of 23 lectures presented at the meeting are collected in this report.

49555 **(Juel—2024) Study of surfaces and surface layers on high temperature materials after short-time thermal loads.** Bolt, H.; Hoven, H.; Koizlik, K.; Linke, J.; Nickel, H.; Wallura, E. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe; Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). Nov 1985. 76p. NTIS (US Sales Only), PC A05/MF A01. File Number DE86752571.

Being part of the plasma-wall interaction during TOKAMAK operation, erosion- and redeposition processes of First Wall materials substantially influence plasma parameters as well as the properties of the First Wall. An important redeposition process of eroded material is the formation of thin films by atomic condensation. Examinations of First Wall components after TOKAMAK operation lead to the assumption that these thin metallic films tend to agglomerate to small particles under subsequent heat load. In laboratory experiments it is shown that thin metallic films on various substrates can agglomerate under short time high heat fluxes and also under longer lasting lower thermal loads, thus verifying the "agglomeration hypothesis".

49556 **(LA-UR—86-2299) COVFILS-2: neutron data and covariances for sensitivity and uncertainty analysis.** Muir, D.W. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 6p. (CONF-860652—19). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013858.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

We have prepared a new, fusion-oriented library of multigroup neutron cross sections, scattering matrices, and covariances (uncertainties and correlations) using modules of the NJOY nuclear data processing system. This 74-group library, called COVFILS-2, was produced specifically for use in the sensitivity and uncertainty analysis of fusion-relevant integral experiments. The 14 materials included in the first version of COVFILS-2 are H, ^{6}Li, ^{7}Li, Be, C, N, O, Na, Al, Si, Cr, Fe, Ni, and Pb.

49557 **(LA-UR—86-2636) Heavy-ion fusion reactor concepts, requirements and attractive features.** Pendergass, J.H. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 10p. (CONF-860510—11). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013821.

From Symposium on heavy ion fusion; Washington, DC, USA (27 May 1986).

Four generic reactor-plant concepts were included in the Heavy Ion Fusion Systems Assessment to provide a wide range of pulse-repetition-rate/target-yield capability - 1 to 20 Hz/150 to 3000 MJ. This permitted exploration of the impact on heavy-ion fusion cost of electricity (COE) of the repetition-rate and efficiency advantages of induction linacs relative to other ICF drivers. Minimum COE results are encouraging - from 55 to 75 mills/kWh for 1000-MWe plants to <45 mills/kWh for 1500 MWe. HIF with induction-linac drivers can compete using more than one reactor plant concept. Minimum COE corresponds to reactor repetition rates < 10 Hz for 1000-MWe, one-reactor plants. Contrary to pre-HIFSA expectations, large pulse repetition rates are optimum only for very large plants. COE's are within 5% of minimum COE over wide ranges of repetition rate and target yield. Cost or technological problems is one part of plant parameter space need not be fatal for HIF because of the large low-COE parameter space.

49558 **(NBSIR—86-3050) Materials studies for magnetic fusion energy applications at low temperatures - IX.** Reed, R.P. (ed.). (National Bureau of Standards, Boulder, CO (USA). Fracture and Deformation Div.). May 1986. 326p. NTIS, PC A15/MF A01; 1; GPO Dep. File Number DE86014006.

This report contains results of a research program to produce material property data that will facilitate design and development of cryogenic structures for the superconducting magnets of magnetic fusion energy power plants and prototypes. Nineteen technical papers are presented under four headings reflecting the main program areas: Welding, Nonmetallics, Structural Alloys, and Technology Transfer. Abstracts for each of these papers have been prepared.

49559 (NEANDC(J)—117/U, pp 3-14) **Review on nuclear data for fusion reactors.** Kanda, Y. (Kyushu Univ., Kasuga, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Present status of fusion nuclear data is briefly reviewed taking account of the relation among differential experiment, evaluation, and integral experiment. It is emphasized that covariances should be introduced to the comparison between calculations and experiments and that model calculation should be effectively used in the evaluation of the fusion nuclear data. Preparation of reference data set is proposed to improve model calculation for neutronics.

49560 (NEANDC(J)—117/U, pp 15-31) **Status of JENDL-3PR1 and 3PR2.** Asami, T. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

The compilation of JENDL-3PR1 and -3PR2 was made urgently to use their evaluated data for analyses of integral experiments for fusion neutronics. These files include the evaluated data for eight nuclides important for fusion neutronics, i.e., ^{6}Li, ^{7}Li, ^{9}Be, ^{12}C, ^{16}O, Cr, Fe and Ni. The data for these nuclides except for ^{16}O were obtained by revising the JENDL-2 ones temporarily and the ^{16}O data were evaluated newly. The outline and special features of these evaluated data are described briefly.

49561 (NEANDC(J)—117/U, pp 52-56) **Nuclear data and integral experiments required for fusion reactor nuclear design.** Seki, Y. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Nuclear data required for the nuclear design of fusion reactors are described very briefly. The ^{7}Li cross sections in the GICX40 library which had been derived from ENDF/B-3 were replaced by those derived from JENDL-3PR1. The effects of the replacement on tritium breeding ratios of two types of blankets are

shown. Integral experiments useful for the validation of the data and methods used in the nuclear design are described.

49562 (NEANDC(J)—117/U, pp 57-67) **High tritium breeding ratio (TRB) blanket concept and requirements for nuclear data relating to TBR.** Maki, K. (Hitachi Ltd., Ibaraki, Japan). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

Significance of developing a blanket having a sufficiently larger tritium breeding ratio (TBR) than 1.0 is discussed. For this purpose, a high TBR blanket with a front breeder zone just before the multiplier is introduced together with conventional blankets. From discussion of TBR characteristics in these blankets, the necessity of improving on nuclear data, i.e. reducing uncertainties is presented as follows; σ/sub s/, σ/sub np/ and σ/sub nα/ of structural and coolant materials, and σ/sub n2n/ of the multiplier at higher energies above several MeV, and σ/sub nγ/ of these materials and σ/sub nαT/ of ^{6}Li at energies from several hundred keV to thermal energy.

49563 (NEANDC(J)—117/U, pp 183-195) **Fusion blanket engineering benchmark experiment.** Nakamura, T. (Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken). Mar 1986. Information Div., Dept. of Technical Information, JAERI, Tokai-mura, Naka-jur, Ibaraki-ken, Japan. File Number TI86901123. (JAERI-M—86-029; INDC(JPN)—103/L; CONF-8507114—).

From Specialists' meeting on nuclear data for fusion neutronics; Tokai, Japan (23 Jul 1985).

In Fusion Blanket Engineering Benchmark Experiments at the FNS, simplified systems of composite configurations are deliberately chosen, experimental data are acquired in parametric way, then, the comparisons are made with various calculation results to point out problems associated with the heterogeneous structure and to assess the overall accuracies of the nuclear calculations. The accumulation of the information thus obtained serves to reduce the uncertainties in interpreting the TBR and other neutronic quantities in the conceptual reactor design, performing a complementary role to the basic benchmark experiments. This program has been selected as one of the joint activities between JAERI and US DOE.

49564 (ORNL/FEDC—86/3) **Multiplex tokamak power plant.** Dabiri, A.E. (Oak Ridge National Lab., TN (USA). Fusion Engineering Design Center). Jul 1986. Contract AC05-84OR21400. 38p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014400.

The concept of multiplexing for a fusion power core as an option for producing power is explored. Superconducting, as well as normal magnet, coils in either first or second stability regimes are considered. The results show that multiplex plants with superconducting magnets operating in the second stability regime could be competitive with the single-unit plants in some unit sizes. The key issues that impact the expected benefits of multiplexing must be investigated further. These are factory fabrication, economy of scale, the extent of equipment sharing, inherent safety, maintainability, and utility load management.

49565 (ORNL/FEDC—86/4) **Tokamak System Code Version II.** Reid, R.L. (Oak Ridge National Lab., TN (USA). Fusion Engineering Design Center). Aug 1986. Contract AC05-84OR21400. 84p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE86014399.

The Tokamak System Code has been revised to more accurately model the plasma physics, the poloidal field coil/magnetohydrodynamic (MHD) systems, and the toroidal field (TF) coil system. The plasma physics model now uses a two-fluid representation of the electron-ion power balance and has a wide selection of confinement scalings. The poloidal field coil subroutine was upgraded by incorporating a version of the Fusion Engineering Design Center MHD code. The TF coil subroutine was revised to more accurately model copper TF coil versions of tokamaks.

49566 (ORNL/TM—9992) **Helium mass flow measurement in the International Fusion Superconducting Magnet Test Facility.** Baylor, L.R. (Oak Ridge National Lab., TN (USA). Fusion Energy Div.). Aug 1986. Contract AC05-84OR21400. 32p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86014409.

The measurement of helium mass flow in the International Fusion Superconducting Magnet Test Facility (IFSMTF) is an important aspect in the operation of the facility's cryogenic system. Data interpretation methods that lead to inaccurate results can cause severe difficulty in controlling the experimental superconducting coils being tested in the facility. This technical memorandum documents the methods of helium mass flow measurement used in the IFSMTF for all participants of the Large Coil Program and for other cryogenic experimentalists needing information on mass flow measurements. Examples of experimental data taken and calculations made are included to illustrate the applicability of the methods used.

49567 (PPLK—4) **Annual review of Plasma Physics Laboratory, Kyoto University, April, 1983.** (Kyoto Univ., Uji (Japan). Plasma Physics Lab.). Apr 1983. 130p. NTIS (US Sales Only), PC A07/MF A01. File Number DE86703133.

The devices for additionally heating joule-heated plasma in the Heliotron E, such as electron cyclotron resonance heating and neutral beam injection, were in operation in 1982. In the ECRH experiment the microwaves of 200 kW at 28 GHz were generated by a gyrotron, but the pulse width was extended from 10 ms to 40 ms this year. By this, a currentless plasma of Te-1 keV was achieved. In the NB1 experiment the neutral beam of about 1.5 MW was injected into joule-heated plasma, and the plasma of Ti(O)-950 eV, Te(O)-800 eV and Ne = 3×10^{19}/m^3 was attained. The first experiment to inject neutral beam into ECRH currentless plasma was carried out. By this method the density of the plasma increased as well as the ion temperature and electron temperature. As to the theory, a critical beta was calculated by using stellarator expansion, which should be 3 to 7% in the Heliotron E. Two gyrotrons of 200 kW at 53 GHz each and an ion cyclotron resonance heating equipment of 1.5 MW at 26.7 MHz are prepared. As to the reactor study, the design of Heliotron H in the first phase was completed. The location of impurity sources in NB1 ion sources and beam lines was found.

49568 (SAND—86-1706C) **Progress in light ion beam fusion research on PBFA II.** Cook, D.L.; Allshouse, G.O.; Bailey, J.; Barr, G.W.; Boyes, J.D.; Burgess, E.L.; Boyer, W.B.; Cap, J.S.; Coats, R.S.; Dreike, P.L.;. (Sandia National Labs., Albuquerque, NM (USA)). 1986. Contract AC04-76DP00789. 10p. (CONF-860710—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014370.

From 13. annual plasma physics conference; Oxford, UK (2 Jul 1986).

We are conducting pulsed power characterization experiments on PBFA II aimed at bringing the accelerator to a fully operational state. During this period we are acquiring substantial amounts of data on accelerator performance and initial data on ion diode performance. Next year, we will begin to concentrate on ion beam generation and focusing, with the goal of reaching the levels of beam energy, power, and intensity needed for ignition scaling experiments. Once the beam has been focused, initial target experiments will begin. The far term plans for PBFA II now include development and demonstration of the pulse-shaping techniques which are necessary for high-gain target compressions. Following a modification of the accelerator which will probably include an "extraction" ion diode, a 4- to 5-meter plasma channel for beam bunching during propagation, and a target chamber located beneath the accelerator, temporally-shaped ion beam pulses will be available for pulse-shaped target experiments.

49569 (UCID—20234) **Flibe/He concept.** Moir, R. (Lawrence Livermore National Lab., CA (USA)). Oct 1984. Contract W-7405-ENG-48. 12p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014403.

As in all fusion blankets many physics and engineering parameters influence material temperature and heat transfer to the

coolant. In performing thermal-hydraulics calculations for the Flibe/He concept, the first wall was assumed to be 5 MW/m². The coolant is helium with a nominal pressure of 50 atmospheres. To eliminate "pinch-point" steam generator problems a helium inlet temperature of 275°C was specified. Helium outlet temperature was limited to 500°C in order to not have structural HT-9 steel above 550°C. That limit for HT-9 has been imposed due to neutron damage effects which seriously detract from its ductility and strength above that temperature. Volumetric heating calculations at various blanket locations are given.

49570 (UCID—20559-Vol.2, pp A.1-A.164) **Fusion engineering design center appendix to the MINIMARS interim report.** Nelson, W.D.; Blackfield, D.T.; Bussell, G.T.; Gorker, G.E.; Keeton, D.C.; Lousteau, D.C.; Spampinato, P.T.; Taylor, G.E.; Yugo, J.J. (Oak Ridge National Lab., TN). Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

Personnel at the Fusion Engineering Design Center (FEDC) have been contributing partners in the mirror program for the past four years. These years have involved work on machines such as the Technology Demonstration Facility (TDF), the MFTF-Alpha+T (an upgrade of the MFTF-B), and the Fusion Power Demonstration (FPD) device. This year, the effort was directed toward the MINIMARS design. The principle role for the FEDC has been to integrate the various concepts into an overall, integrated engineering design. The present design is not, at this time in the study effort, a self-consistent design, but it will be by the end of the study. In addition to integrating the design, FEDC has played a major innovation and design role in electrical systems, plasma heating systems, maintenance, availability, fueling, facilities, and reactor components. FEDC has also played a major role in developing an optimization code for tandem mirrors, which has been used to establish baseline MINIMARS physics and engineering parameters and to perform many physics and engineering trade studies. In addition, the Design Center has supplied cost estimates for the MINIMARS reactor. This appendix contains two kinds of material. The first is an expansion of the material found in the FY 1985 MINIMARS summary report and the second is a description of background studies performed during the year that led to the concepts and conclusions described in the summary report.

49571 (UCID—20559-Vol.2, pp C.1-C.14) **Appendix C: safety design rationale.** Ghose, S. (Bechtel Group Inc., San Francisco, CA). Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

A brief discussion of the rationale for safety design of fusion plants is presented in the main text. Further detail safety considerations are presented in this appendix in the form of charts and tables. The author present some of the major safety criteria and other criteria used in blanket selection here.

49572 (UCID—20559-Vol.2, pp D.1-D.14) **Appendix for blanket - University of Wisconsin: tritium issues.** Wittenberg, L.J. (Univ. of Wisconsin, Madison). Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

The selection of the liquid metal alloys, $Li_{17}Pb_{83}$, as the tritium breeder with helium serving as the heat transfer fluid suggests two alternative techniques for the removal of tritium from the breeder. The low solubility of tritium in this liquid breeder requires only a simple vacuum degassing technique for tritium removal. Because of this high tritium partial pressure, tritium removal in the present design could potentially be achieved by either (a) slow circulation of the liquid LiPb alloy to an external degassing system, or (b) noncirculation of the liquid breeder so that the tritium permeates through the walls of the coolant tubes into the circulating helium for subsequent recovery. Both of these techniques were investigated with special attention given to the resultant tritium inventories in the liquid breeder and the helium system, and the potential for tritium permeation at the steam generator (SG).

49573 (UCID—20559-Vol.2, pp E.1-E.30) **Activation product transport in a FLiBe-vanadium alloy-HT9 system.** Klein, A.C.; Sze, D.K. (Oregon State Univ., Corvallis). Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

An assessment is made of the gamma radiation hazards likely to be found around a fusion reactor heat transfer and tritium breeding loop which employs a vanadium alloy for the blanket and first wall structure and the ferritic-steel HT9 for the remainder of the loop. The coolant/tritium breeding fluid is the molten metallic salt FliBe. Since the radiation levels near the primary loop components are found to be less than 100 mR/hr 3-5 days after shutdown after three years of continuous full power operation, limited hands-on maintenance could be allowed. The very short half-lives of the predominant corrosion products make this result possible and make such a system very attractive.

49574 (UCID—20559-Vol.2, pp F.1-F.36) **Halo scraper/direct converter system study.** Luzzi, T.; Clarkson, I.; Barr, W.; Neef, W. Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

During the first year of the LLNL Minimars program, a system study was undertaken to determine the most efficient method for recovery of the end cell thermal energy. The goal of the study was to recovery energy at the highest possible coolant temperature and therefore at the highest thermal efficiency. Two types of coolant were considered, water and gaseous helium. In a system study where the goal is to recover maximum thermal power in an economically designed device, it is necessary to place constraints on the design. The four constraints for the direct converter are somewhat conflicting in that a particularly design solution satisfying one may lead to an unacceptable solution for another. The final design choice must be a compromise that satisfies all the constraints.

49575 (UCID—20559-Vol.2, pp G.1-G.12) **Appendix G. Heat transport and power conversion.** Ghose, S. (Bechtel Group Inc., San Francisco, CA). Dec 1985. NTIS, PC A13/MF A01. File Number DE86006102.

In MINIMARS conceptual design: Report I. Volume 2.

A brief description of the heat transport system is given in the main text. The following aspects of heat transport are discussed in this appendix: after heat removal, integrated primary-coolant piping, and number of steam generators.

49576 (UCRL—52000-86-4/5) **Energy and Technology Review, April-May 1986.** Cabayan, H.S.; Coleman, L.W.; Adye, P.; Clements, W.; de Vore, L.; Hendry, D.P.; Kirvel, R.D.; O'Neal, E.M.; Taft, S.O. (Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 62p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014244.

Some technical challenges were solved to construct the large-aperture frequency-conversion arrays for NOVA. Among these are precision machining of potassium dihydrogen phosphate crystals, precise crystal orientation, and reflection coatings. New glass-melting techniques are reported that can produce the inclusion-free glass that will be used to replace the glass disks now in the NOVA laser amplifiers. A system for detecting microscopic inclusions in optical glass is described. A second target chamber has been added that uses two beams of the NOVA laser. Recent achievements in soft x-ray lasing are discussed. The Laser Experiments Analysis Facility (LEAF) is described briefly. The Cascade reactor, a concept for producing electricity from inertial confinement fusion, is discussed. (LEW)

49577 (UCRL—53750) **Preparation and properties of polyvinyl alcohol microspheres.** Campbell, J.H.; Grens, J.Z.; Poco, J.F.; Ives, B.H. (Lawrence Livermore National Lab., CA (USA)). Jun 1986. Contract W-7405-ENG-48. 45p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86015111.

Polyvinyl alcohol (PVA) microspheres, having a size range of ~150- to 250-μm diameter with 1- to 5-μm wall thickness, have

been fabricated using a solution droplet technique. The spheres were developed for possible use on the Lawrence Livermore National Laboratory (LLNL) Inertial Confinement Fusion (ICF) Program. PVA, a polymer chosen based on earlier survey work carried out at KMS Fusion, Inc., has good strength, low hydrogen permeability, is optically transparent, and water soluble. The latter property makes it safe and easy to use in our droplet generator system. A unique dual-orifice droplet generator was used to prepare the spheres. The droplet generator operating conditions and the column processing parameters were chosen using results from our 1-D model calculations as a guide. The polymer microsphere model is an extension of the model we developed to support the glass sphere production. After preparation, the spheres were physically characterized for surface quality, sphericity, wall thickness (and uniformity), and size. We also determined the buckling pressure for both uncoated and CH-coated spheres. Radiation stability to beta decay (from tritium) was evaluated by exposing the spheres to a 7-keV electron beam. The results from these and other physical property measurements are presented in this report.

49578 **(UCRL—94084) Helium-cooled, FLiBe-breeder, beryllium-multiplier blanket for MINIMARS.** Moir, R.W.; Lee, J.D. (Lawrence Livermore National Lab., CA (USA)). Jun 1986. Contract W-7405-ENG-48. 7p. (CONF-860652—16). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013898.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

We adapted the helium-cooled, FLiBe-breeder blanket to the commercial tandem-mirror fusion-reactor design, MINIMARS. Vanadium was used to achieve high performance from the high-energy-release neutron-capture reactions and from the high-temperature operation permitted by the refractory property of the material, which increases the conversion efficiency and decreases the helium-pumping power. Although this blanket had the highest performance among the MINIMARS blankets designs, measured by Mn/sub th/ (blanket energy multiplication times thermal conversion efficiency), it had a cost of electricity (COE) 18% higher than the University of Wisconsin (UW) blanket design (42.5 vs 35.9 mills/kW.h). This increased cost was due to using higher-cost blanket materials (beryllium and vanadium) and a thicker blanket, which resulted in higher-cost central-cell magnets and the need for more blanket materials. Apparently, the high efficiency does not substantially affect the COE. Therefore, in the future, we recommend lowering the helium temperature so that ferritic steel can be used. This will result in a lower-cost blanket, which may compensate for the lower performance resulting from lower efficiency.

49579 **(UCRL—94115) TIBER II: an upgraded tokamak igntion/burn experimental reactor.** Henning, C.D.; Logan, B.G.; Perkins, L.J.; Barr, W.L.; Bulmer, R.H.; Devoto, R.S.; Doggett, J.N.; Fenslermacher, M.; Johnson, B.M.; Lee, J.D. (Lawrence Livermore National Lab., CA (USA); TRW, Inc., Redondo Beach, CA (USA); Wisconsin Univ., Madison (USA)). 5 Jun 1986. Contract W-7405-ENG-48. 10p. (CONF-860652—15). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013899.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

We are disIgning a minimum-size Tokamak ignition/Burn Reactor (TIBER II). This design incorporates physics requirements, neutron wall loading and fluence parameters that will make it compatible with a nuclear testing mission. Reactor relevant physics will be tested by using current drive and steady-state operation. Although the design accommodates several current drive options, including neutral beams, the base case uses a combination of lower hybrid and electron-cyclotron radio frequency power. Minimum neutron shielding, compact structures, high magnet-current densities, and remotely maintainable vacuum seals, all contribute to the compact size.

49580 **(UCRL—94693) In-situ MHD energy conversion for fusion.** Campbell, R.B.; Logan, B.G.; Hoffman, M.A. (TRW, Inc., Redondo Beach, CA (USA); Lawrence Livermore National Lab., CA (USA); California Univ., Davis (USA)). Jun 1986. Contract W-7405-ENG-48. 11p. (CONF-860652—18). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013901.

From 7. topical meeting on the technology of fusion energy; Reno, NV, USA (15 Jun 1986).

An advanced concept, in-situ MHD conversion, is described for converting fusion energy to electricity. Considerable cost savings can be realized because of the conversion of thermal energy to electricity achieved in the blanket by means of magnetohydrodynamic (MHD) generators. The external disk generator, also described, is another application of the MHD idea, which may have certain advantages over the in-situ scheme for advanced-fuel tokamaks. The feature that makes these schemes fusion-specific is the novel use of the electro-magnetic radiation naturally emitted by the plasma. The synchrotron radiation can be used either to heat the nonequilibrium MHD plasma, or possibly improve its stability. A Rankine cycle with cesium-seeded mercury as a working fluid is used in either case. Performance predictions by a quasi-one-dimensional model are presented. An experiment to determine the effect of microwave radiation on channel performance is planned.

49581 **(UCRL—94815) Numerical study of the mode selection in response spectrum analysis-condensed version.** Ng, D.S. (Lawrence Livermore National Lab., CA (USA)). 1 Sep 1986. Contract W-7405-ENG-48. 18p. (CONF-8609119—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86013023.

From Building design and construction conference; Beijing, China (1 Sep 1986).

For quality assurance of the dynamic response spectrum analysis, the Nuclear Regulatory Commission (NRC) recommends retaining all modes below the cutoff frequency at which the spectral acceleration (S/sub a/) returns to the peak zero period acceleration (ZPA). It also suggests that modes accounting for at least 90 percent of the structural masses be included in the analysis. A simple frame-type structure is generated as a baseline frame. Then groups of oscillators representing substructure are added onto the frame to study substructure behavior. A base case is established for each frame by including the specific number of modes used. The tests are conducted by incrementing the number of modes in the response spectrum analyses starting with one mode. The structural response of each modal increment is compared with the base case to identify the efficiency of mode selection method. All three methods are then applied to the MFTF-B Axicell Vacuum Vessel. The responses in critical components of the vessel, such as hangers and foundations, will be analyzed to confirm the accuracy of the selected method.

49582 **Fast-opening magnetic valve for high-pressure gas injection and applications to hydrogen pellet fueling systems.** Milora, S.L.; Combs, S.K.; Foust, C.R. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). **57**: No. 9, 2356-2358(Sep 1986). Contract AC05-84OR21400.

A fast, magnetically driven gas valve and its application to pneumatic-based solid hydrogen pellet injectors are described. The valve, which is equipped with a polyimide stem tip (hard seal) and a 5-mm-diam orifice, can open against working pressures up to 140 bar (2000 psi). Other unique features of this design include temperature- and radiation-resistant seals, a programmable output pressure pulse, and repetitive operation in excess of 20 Hz. A prototype valve has been used to propel frozen hydrogen isotope pellets to speeds of up to 1900 m/s.

49583 **Options for commercial tokamaks.** Dabiri, A.E.; Keeton, D.C.; Thomson, S.L. (Fusion Engineering Design Center/SAIC, Oak Ridge National Lab., P.O. Box Y, Oak Ridge, TN 37831). *Fusion Technology;* **10**: No. 1, 49-57(Jul 1986).

Systems studies have been performed at the Fusion Engineering Design Center (FEDC) to assess commercial tokamak options. One study investigates the economics of high-beta operation

and determines an optimum operating range of 10 to 20% beta, with a corresponding neutron wall loading of 6 to 8 MW/m². A second study determines conditions under which small, low-power tokamaks can be economically combined into a 1200-MW(electric) multiplex power plant. The results of these studies have directed future efforts at the FEDC toward a high-beta, tokamak design using a modular maintenance configuration.

49584 **Design concept of cryogenic falling liquid film helium separator.** Kinoshita, M.; Yamanishi, T.; Bartlit, J.R.; Sherman, R.H. (Japan Atomic Energy Research Institute, Dept. of Thermonuclear Fusion Research, Tokai-mura, Ibaraki-ken 319-11). *Fusion Technology;* **10**: No. 1, 137-148(Jul 1986).

A design concept is developed for a cryogenic falling liquid film helium separator by clarifying the differences between this process and a cryogenic distillation column. The process characteristics are greatly improved by the idea of adding an H_3 gas flow to a point near the upper end of the packed section. The flow rate of tritium lost from the top is kept extremely low with an adequately short packed section, and the column pressure is reduced to 1 atm. The addition causes no appreciable increase in the protium percentage ($\approx$1%) in the bottom liquid flow. A design procedure applying the Colburn-Hougen method is proposed for determining specifications of the refrigerated section. It is shown that the presence of noncondensible helium requires a significantly larger heat transfer area mainly because the mass transfer resistance increases enormously as the condensation of hydrogen isotopes proceeds. Control schemes are also proposed: The tritium concentration in the top gas is controlled by the H_3 gas flow rate. The pressure rise caused by an increase of the helium percentage within the refrigerated section, which cannot readily be eliminated by changing input specifications of the refrigerant gas, is avoided by increasing the top gas flow rate to release more helium from the top.

49585 **Vacuum vessel eddy current modeling for tokamak fusion test reactor adiabatic compression experiments.** DeLucia, J.; Bell, M.; Wong, K.L. (Plasma Physics Lab., Princeton Univ., P.O. Box 451, Princeton, NJ 08544). *Fusion Technology;* **10**: No. 1, 124-136(Jul 1986).

A relatively simple current filament model of the Tokamak Fusion Test Reactor (TFTR) vacuum vessel is described. It is used to estimate the three-dimensional structure of magnetic field perturbations in the vicinity of the plasma that arise from vacuum vessel eddy currents induced during adiabatic compression. Eddy currents are calculated self-consistently with the plasma motion. The Shafranov formula and adiabatic scaling laws are used to model the plasma. Although the specific application is to TFTR, the present model is of general applicability.

49586 **Measurement and analysis of near-classical thermal transport in one-micron laser-irradiated spherical plasmas.** Hauer, A.; Mead, W.C.; Willi, O.; Kilkenny, J.D.; Bradley, D.K.; Tabatabaei, S.D.; Hooker, C. (Los Alamos National Lab., NM). **53**: No. 27, 2563-2566(31 Dec 1984).

Solid spherical layered targets have been uniformly illuminated at irradiances of 10^{14} to 10^{15} W/cm². Extensive diagnostics including time-resolved x-ray emission and optical probing were used to determine the plasma ablation rate and the plasma blowoff conditions. Comparisons with hydrodynamic simulations show that the thermal conduction is well characterized by a flux limit f/sub e/ = 0.08 +/- 0.02, with a steep temperature gradient. The steepness of the heat front was confirmed with time-resolved spectroscopy. 13 references, 5 figures.

49587 **Long-pulse beamlines for the mirror fusion test facility.** Stone, R.R.; Goldner, A.I.; Poulsen, P. (Lawrence Livermore National Lab., CA, USA). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

Recently obtained test results indicate that a beam of pure full-energy deuterium particles can be delivered to the plasma targets in MFTF-B. A close-coupled separator magnet is used with the ion source to separate the impurities from the full-energy deuterium particles. The completed studies show that the usual iron-core sweep magnet and shielding used in neutral beamlines can be eliminated and the gas flow out of the beamline decreased. This design also reduces beam losses. Smooth-bore OFHC tube arrays brazed to manifolds will be used for the active heat transfer surfaces. Tests indicate that both burnout and life requirements are met by this design. Test results are presented and the MFTF-B long-pulse beamline configuration is discussed.

49588 **Challenge of handling long-pulse neutral beams - the NBETF experience.** Berkner, K.H.; Jacobson, V.L.; Paterson, J.A.; Pincosy, P.A.; Owren, H.M.; Kilgore, R.L. (Lawrence Berkeley Lab., CA, USA). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

The Neutral Beam Engineering Test Facility (NBETF) is a state-of-the-art facility for testing advanced-design neutral-beam system components for the U.S. Fusion Program. The commissioning of this facility with 80-kV, 40-A, 30-sec beams at a 10% duty cycle is described, as are some of the problems that were encountered: fatigue failure of bellows, electrical interference with calorimetry signals, and thermal damage by backscattered beam.

49589 **Neutral beam heating systems for TFTR - initial operating results.** Prichard, B.A. Jr.; Eubank, H.P.; Grisham, L.R.; Kamperschroer, J.H.; Kugel, H.W.; Martin, G.D.; Prechter, R.E.; Williams, M.D.; Winje, R.A.; Wright, K.E. (Princeton Univ., NJ, USA. Plasma Physics Lab.). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

The first few weeks of attempted operation have resulted in the injection of <=1.5 MW of hydrogen into TFTR from a single beamline, and a second beamline is scheduled to begin operation this fall. The status of the TFTR Neutral Beam System is described and future plans are presented. Various problems encountered during commissioning and their solutions are also discussed.

49590 **Progress in fusion technology in the U.S. Magnetic Fusion Program.** Dowling, R.J.; Beard, D.S.; Haas, G.M.; Stone, P.M.; George, T.V. (Department of Energy, Washington, DC, USA. Office of Fusion Energy). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

A review is presented of some of the recent progress and the future plans of fusion technology in the U.S. Magnetic Fusion Program.

49591 **TFCX - mechanical design.** Citrolo, J.C. (Princeton Univ., NJ, USA. Plasma Physics Lab.). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

Ignition and long pulse equilibrium burn have been identified as the mission for the next device to be built in the U.S. fusion program. This device, the Tokamak Fusion Core Experiment (TCFX), has recently been the subject of pre-conceptual design studies which were performed by a design team composed of members from most of the major U.S. fusion laboratories. These studies produced four versions of the TFCX design. Two version included su-

perconducting toroidal field (TF) coils and two used copper TF coils. These categories were then subdivided into two further options: a normal and a high performance design which are described.

49592 **Overview of the modification to the Poloidal Divertor Experiment (PDX) to produce the Princeton Beta Experiment (PBX).** Knutson, D. (Princeton Univ., NJ, USA. Plasma Physics Lab.). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

The Poloidal Divertor Experiment at the Princeton Plasma Physics Laboratory has been recently transformed into the Princeton Beta Experiment. The purpose of the modification is to produce a bean-shaped plasma with beta values in excess of 10%, which is substantially above those achieved with more conventional plasma shapes.

49593 **Mechanical design of a high-beta TFCX tokamak with a demountable TF coil.** Puhn, F.; Blevins, R.; Doll, D.; Engholm, B.; Ho, M.; Leuer, J.; Sevier, L.; Wesley, J. (GA Technologies, Inc., San Diego, CA, USA). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

A TFCX tokamak concept developed by GA Technologies is described. Removal of the poloidal field coils and plasma chamber can be accomplished by simple vertical lifts, after demounting the TF coil upper section. A unique electrical joint allows demounting of the TF coil. Combined-function poloidal field coils located close to the plasma provide versatility in plasma-shaping experiments. Shield modules allow contact maintenance above and below the tokamak, and support the PF coils and plasma chamber. Major penetrations and system interfaces are located at the outboard region for remote maintenance equipment access.

49594 **Electromagnetic forces distribution and mechanical analysis in the first wall structure for INTOR/NET.** Coccorese, E.; Martone, R.; Rubinacci, G.; Biggio, M.; Inzaghi, A.; Deleanu, L.; Turri, M. (Naples Univ., Italy; Commission of the European Communities, Ispra, Italy. Joint Research Centre; Oak Ridge National Lab., TN, USA; MATEC s.r.l., Milan, Italy). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

In the context of the studies performed at JRC-Ispra for NET/INTOR, a modular stainless steel first wall, and separated from the blanket which it envelops has been proposed. During plasma disruption the metallic structure of the first wall is inevitably subject to appreciable electromagnetic forces caused by induced eddy current-magnetic field interactions. The deformation and stress distributions in the first wall were quantified at various instants of time by three-dimensional calculations using the ICES-STRUDL code.

49595 **Fusion nuclear technology development: issues and strategy.** Abdou, M.A. (California Univ., Los Angeles, USA. School of Engineering and Applied Science). pp vp of Fusion technology 1984. Proceedings of the thirteenth symposium. Conference centre of Villa Ponti, Varese, Italy, 24-28 September 1984. Volume 1 of 2 . Oxford, England; Pergamon Press (1984). (CONF-840915—; EUR—9183-EN).

From 13. symposium on fusion technology; Varese, Italy (24 Sep 1984).

The technical and programmatic objectives of fusion nuclear technology development are being addressed in a study called FINESSE. The study is identifying the issues, quantifying the test requirements, developing engineering scaling relationships and evaluating non-fusion and fusion facilities for nuclear testing. The results are found to be of fundamental importance to developing successful scenarios for overall fusion development.

99 GENERAL AND MISCELLANEOUS

49596 **(DOE/MA—0240) Report to Congress on the small business program of the Department of Energy, FY 1985.** (USDOE Assistant Secretary for Management and Administration, Washington, DC. Office of Small and Disadvantaged Business Utilization). Jun 1986. 47p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014326.

This Report to Congress covers twenty-seven organizational components of the Department including seven Assistant Secretaries, the eight Operations Offices, the five power administrations, two other administrations and several significant offices. The Act excludes military applications of nuclear energy.

49597 **(LA-UR—86-1481) Can the US afford a lunar base.** Keaton, P.W. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 11p. (CONF-860179—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86010207.

From Workshop on astronomical observations from a lunar base; Houston, TX, USA (10 Jan 1986).

Establishing a lunar base will require steady funding for a decade or two. The question addressed here is whether such a large space project is affordable at this time. The relevant facts and methodology are presented so that the reader may formulate independent answers. It is shown that a permanent lunar base can be financed without increasing NASA's historical budgetary trends.

49598 **(N—86-22784) Telecommunications and Data Acquisition Report. Progress report, October-December 1985.** Posner, E.C. (Jet Propulsion Lab., Pasadena, CA (USA)). Feb 1986. 275p. (NASA-CR—176691). NTIS, PC A12/MF A01.

Deep Space Network progress in flight project support, tracking and data acquisition research and technology, network engineering, hardware and software implementation, and operations is documented. In addition, developments in Earth-based radio technology as applied to geodynamics, astrophysics and the radio search for extraterrestrial intelligence are reported.

49599 **(SAND—86-2068) Annual report: technology transfer, Sandia National Laboratories, fiscal year 1985.** (Sandia National Labs., Albuquerque, NM (USA). Technology Transfer and Management Dept.). Jul 1986. Contract AC04-76DP00789. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014945.

Sandia National Laboratories, a national security engineering and science laboratory, strives to place its technology efficiently in the hands of the private sector, government laboratories, other contractors, and universities. The goal of extending technology developments beyond our primary emphasis on national defense is consistent with a wider view in which the needs of national security encompass energy stability, economic competitiveness, environmental preservation, and other areas that maintain our national vitality. This report highlights examples of technology transfer from the past year and summarizes our activities and concerns.

9901 Management

49600 **(INIS-mf—10201) List of publications of the University of Karlsruhe and the Karlsruhe Nuclear Research Centre. Publications of 1984.** (Karlsruhe Univ. (T.H.) (Germany, F.R.). Bibliothek; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Literaturabteilung). 1985. 203p. (In German). NTIS (US Sales Only), PC A10/MF A01. File Number DE86752602.

This list covers books and periodicals, articles in periodicals and collective publications, scientific reports, theses and habilita-

tions composed or edited by institutions, their organs and institutes as well as their teaching staff and scientific collaborators, and indicates moreover patents.

9902 Mathematics And Computers

REFER ALSO TO CITATION(S) 47157, 47158, 47807, 48028, 48301, 48376, 49209, 49214

49601 (AD-A—167620/4/XAB) Distributed computing for signal processing: modeling of asynchronous parallel computation. Appendix B. Design of the operating system for the PASM parallel-processing system. Final report. Tuomenoksa, D.L. (Purdue Univ., Lafayette, IN (USA)). May 1983. 347p. NTIS, PC A15/MF A01.

As a result of advances in microcomputer technology, it is now feasible to build large-scale parallel-processing systems capable of performing image-processing tasks more rapidly than previously possible. Such parallel-processing systems add levels of complexity for both the operating system and the application software. They impose constraints that make a direct transplantation of conventional (multiprogrammed) operating systems extremely inefficient (Bae80). This thesis considers the design of PASMOS, a distributed operating system for the PASM parallel-processing system. PASM is a reconfigurable multimicrocomputer system which is being designed at Purdue University for image-processing and pattern-recognition applications. The special-purpose nature of PASM has been exploited in the design of PASMOS. PASMOS has a hierarchical structure and is distributed throughout the hardware components of PASM. It utilizes the PASM hardware to create an execution environment (virtual machine) for parallel processing tasks. Facilities provided by PASMOS include those for task management and scheduling, memory management, user interaction, process communication and synchronization, and protection. The general performance of the PASM system was examined both analytically and via simulation.

49602 (AD-A—167621/2/XAB) Distributed computing for signal processing: modeling of asynchronous parallel computation. Appendix C. Fault-tolerant interconnection networks and image-processing applications for the PASM parallel processing systems. Final report. Adams, G.B. (Purdue Univ., Lafayette, IN (USA)). Dec 1984. 371p. NTIS, PC A16/MF A01.

The demand for very-high-speed data processing coupled with falling hardware costs has made large-scale parallel and distributed computer systems both desirable and feasible. Two modes of parallel processing are single-instruction stream-multiple data stream (SIMD) and multiple instruction stream - multiple data stream (MIMD). PASM, a partitionable SIMD/MIMD system, is a reconfigurable multimicroprocessor system being designed for image processing and pattern recognition. An important component of these systems is the interconnection network, the mechanism for communication among the computation nodes and memories. Assuring high reliability for such complex systems is a significant task. Thus, a crucial practical aspect of an interconnection network is fault tolerance. In answer to this need, the Extra Stage Cube (ESC), a fault-tolerant, multistage cube-type interconnection network, is defined. The fault tolerance of the ESC is explored for both single and multiple faults, routing tags are defined, and consideration is given to permuting data and partitioning the ESC in the presence of faults. The ESC is compared with other fault-tolerant multistage networks. Finally, reliability of the ESC and an enhanced version of it are investigated.

49603 (AD-A—167622/0/XAB) Distributed computing for signal processing: modeling of asynchronous parallel computation. Appendix G. On the design and modeling of special-purpose parallel-processing systems. Final report. Smith, B.W. (Purdue Univ., Lafayette, IN (USA)). May 1985. 317p. NTIS, PC A14/MF A01.

As the capabilities of computing machinery grow, so does the diverse variety of their applications. The feasibility of many approaches to these applications depends solely upon the existence of computing machinery capable of performing these tasks within a given time constraint. Because the majority of the available computing machinery is general-purpose in nature, tasks that do not require purpose facilities, but that do require high throughput, are condemned to execution on expensive general-purpose hardware. This research describes several tasks that require fast computing machinery. These tasks do not require general-purpose facilities in the sense that the computing machinery used will only perform a fixed set of tasks. Some of the tasks are simple in nature, but are required to execute on very-large data sets. Other tasks are computationally intensive in addition to possibly involving large data sets. Both simple and complex algorithms are considered. The discussion includes a description of the tasks. All of the above tasks are useful; however, their value is determined in part by the time required to perform them. This work discusses three architectures for performing remote-sensing tasks. These architectures can execute the described tasks more quickly than conventionally available hardware.

49604 (ANL/MCS-TM—73) Projected gradient methods for linearly constrained problems. Calamai, P.H.; More, J.J. (Argonne National Lab., IL (USA). Mathematics and Computer Science Div.; Waterloo Univ., Ontario (Canada). Dept. of Systems Design Engineering). May 1986. Contract W-31-109-ENG-38. 23p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014084.

The aim of this paper is to study the convergence properties of the projected gradient method and to apply these results to algorithms for linearly constrained problems. The main convergence result is obtained by defining a projected gradient, and proving that the gradient projection method forces the sequence of projected gradients to zero. A consequence of this result is that if the projected gradient method converges to a nondegenerate point of a linearly constrained problem, then the active and binding constraints are identified in a finite number of iterations. As an application to the theory, quadratic programming algorithms are developed that iteratively explore a subspace defined by the active constraints. These algorithms are able to drop and add many constraints from the active set, and can either compute an accurate minimizer by a direct method, or an approximate minimizer by an iterative method of the conjugate gradient type. Thus, these algorithms are attractive for large scale problems. It is shown that it is possible to develop a finitely terminating quadratic programming algorithm without nondegeneracy assumptions. 14 refs.

49605 (ANL/MCS-TM—74) Toolpack tools ISTUD, ISTCD, and ISTSB: guide for users and installers. Cowell, W.R. (Argonne National Lab., IL (USA). Mathematics and Computer Science Div.). Jun 1986. Contract W-31109-ENG-38. 11p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86015102.

ISTUD (the DO loop unrolling tool), ISTCD (the DO loop condensing tool), and ISTSB (the substitution/elimination tool) transform certain Fortran structures typically found in basic linear algebra routines. The tools are invoked in various sequences, together with other Toolpack tools, to create transformed Fortran for compilation by a vectorizing compiler. The transformed code makes fewer accesses to memory, thereby significantly improving its performance on machines with a vector architecture.

49606 (ANL/MCS-TM—77) Unix shell scripts to invoke a set of Toolpack/1 tools. Cowell, W.R. (Argonne National Lab., IL (USA). Mathematics and Computer Science Div.). Jul 1986. Contract W-31-109-ENG-38. 15p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86015101.

Unix scripts which call programming tools from the Toolpack/I software are described. These tools will extend the Fortran analyzing and transforming capabilities of Unix. (DWL). 13 refs.

49607 (ANL/MCS-TM—78) ELEFUNT test results under FX/FORTRAN Version 1.0 on the Alliant FX/8. Cody, W.J. (Argonne National Lab., IL (USA). Mathematics and Computer Science Div.). Jul 1986. Contract W-31-109-ENG-38. 31p. NTIS, PC A03/MF A01; GPO Dep. File Number DE86015100.

This paper summarizes and analyzes the results of running various programs designed to test the arithmetic and the Fortran elementary and intrinsic function packages. The programs run in-

clude MACHAR and the ELEFUNT suite of transportable Fortran test programs, from the Software Manual for the Elementary Functions by Cody and Waite, the Fortran version of the arithmetic test program PARANOIA, and the prototype programs from the nascent INTFUNT test suite for intrinsic functions. All tests were run using Release 1.0 of FX/Fortran under Release 1.0 of the Concentrix operating system. 7 refs., 4 tabs.

49608 **(CEA-CONF—7941) Computer algebra as a research tool in physics.** Drouffe, J.M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Apr 1985. 11p. (CONF-8504175—1). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750869.

From European conference on computer algebra; Linz, Austria (1 Apr 1985).

The progress of computer algebra observed during these last years has had certainly an impact in physics. I want to make precise the role of these new techniques in this application domain and to analyze their present limitations. In Section 1, I describe briefly the use of algebraic manipulation programs at the elementary level. The numerical and symbolic solutions of problems are compared in Section 2. Section 3 is devoted to a prospective about the use of computer algebra at the highest level, as an "intelligent" system. I recall in Section 4 what is required from a system to be used in physics.

49609 **(CERN—86-01) VMEbus in physics conference. Proceedings.** (European Organization for Nuclear Research, Geneva (Switzerland)). 30 Jan 1986. 372p. (CONF-8510319—). NTIS (US Sales Only), PC A16/MF A01. File Number DE86703218.

From VMEbus in physics conference; Geneva, Switzerland (7 Oct 1985).

The first conference "VMEbus in Physics" was held at CERN on 7th and 8th October 1985. The conference surveyed the applications of the VMEbus standards in physics, with special emphasis on particle physics and accelerator control. Developments in the definition of the standards and in the formation of users groups were discussed. Manufacturer's representatives were given the opportunity to appreciate the requirements of the fast-growing VMEbus market in the physics community. These proceedings contain the unedited text of the oral and poster presentations given on that occasion.

49610 **(CONF-860963—1) Programming robotics applications on an advanced hypercube multiprocessor.** Barhen, J. (Oak Ridge National Lab., TN (USA). Center for Engineering Systems Advanced Research). 1986. Contract AC05-84OR21400. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86008895.

From International NATO workshop on languages for sensor-based control in robotics; Castelvecchio Pascoli, Italy (1 Sep 1986).

Specialized computer architectures for advanced robotics applications at ORNL/CESAR are based on the hypercube ensemble concept. The current status of algorithm development is summarized and results for robot dynamics and navigation problems are presented. 13 refs., 1 tab.

49611 **(DOE/EIA—0494) EPIC/JANUS user's guide.** (USDOE Energy Information Administration, Washington, DC). 30 Jul 1986. 251p. NTIS, PC A12/MF A01 - GPO; 1; GPO Dep. File Number DE86014116.

EPIC/JANUS, the Energy Information Administration's (EIA) Publication and Interactive Composition System, is a software system the allows text, tables, halftones, and graphics to be combined interactively in a single document. In essence, it automates the entire process of composition and production of camera-ready copy. EPIC is a machine-independent document management and translation system developed by EIA. JANUS is an interactive document composition system which formats and typesets a document. This User's Guide provides complete information on how to use the EPIC/JANUS system. Included in the discussion are sections on getting started, the EPIC system and EIA Standard Text Codes, EPIC interactive commands, graphics in EPIC/JANUS, tables in EPIC/JANUS, EPIC Error messages, MVS and VM listings from EPIC/JANUS, using JANUS interactively, mathematical formula, and producing EPIC/JANUS publications through a displaywriter. Appendices contain a quick reference guide to text codes and text code examples. (DWL)

49612 **(DOE/ER/02383—0120) Automated reference librarians for program libraries and their interaction with language based editors.** Shilling, J.J. (Illinois Univ., Urbana (USA). Dept. of Computer Science). Aug 1986. Contract AC02-76ER02383. 170p. (UIUCDCS-R—86-1268; UILU-ENG—86-1747; COO—2383-0120). NTIS, PC A08/MF A01; GPO Dep. File Number DE86014662.

Thesis.

The design of an automated reference librarian system for computer program libraries is presented and discussed from the point of view of the user, the host, and the system itself. The design is modular and includes 4 components: the managing module, the selection module, the use module, and the database module. A prototype implementation of a reference librarian is presented. (DWL). 62 refs., 6 figs.

49613 **(DOE/ER/25010—T1) Unified approach to parallel computation: performance evaluation and architecturally independent parallel programming. Progress report, September 1, 1985-August 31, 1986.** Browne, J.C. (Texas Univ., Austin (USA). Dept. of Computer Sciences). Jun 1986. Contract FG05-85ER25010. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014683.

The report includes a summary of research in the area of parallel programming, a list of publications, and new research directions. Research accomplishments in the areas of formulating a universal model of parallel computation, the design of architecturally independent programs, the design of algorithmically specialized parallel architectures, and the generalized mapping of computations to architectures are presented. 4 refs. (DWL)

49614 **(DOE/MC/21377—2154) ASPEN costing manual.** Schwint, K.J. (Scientific Design Co., Inc., New York (USA)). 25 Jul 1986. Contract AC21-84MC21377. 452p. NTIS, PC A20/MF A01; 1; GPO Dep. File Number DE86014074.

The ASPEN program contains within it a Cost Estimation System (CES) which estimates the purchase cost and utility consumption rates for major pieces of equipment in a process flowsheet as well as installed equipment costs. These estimates are "preliminary-study grade" with an accuracy of plus or minus 30%. The ASPEN program also contains within it an Economic Evaluation System (EES) which estimates overall capital investment costs, annual operating expenses and profitability indices for a chemical plant. This ASPEN costing manual has been written as a guide for those inexperienced in the use of ASPEN and unfamiliar with standard cost estimating techniques who want to use the ASPEN CES and EES. The ASPEN Costing Manual is comprised of the following sections: (1) Introduction, (2) ASPEN Input Language, (3) ASPEN Cost Estimation System (CES), (4) ASPEN Cost Blocks; and (5) ASPEN Economic Evaluation System (EES).

49615 **(EGG—10282-1114) Information modeling techniques for scientific applications.** Baltz, D. (EG and G Energy Measurements, Inc., Las Vegas, NV (USA)). 1986. Contract AC08-83NV10282. 27p. (CONF-860889—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014026.

From Structured development forum; Seattle, WA, USA (11 Aug 1986).

A series of transparencies graphically show processes involved in the acquisition, analysis, and processing of experimental data. Topics addressed include data base files, data structures, relationships between data and signal relationships.

49616 **(INS-PT—33) Manual on usage of the Nuclear Reaction Data File (NRDF).** (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Oct 1984. 74p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. File Number DE86703219.

In the computer in the Institute for Nuclear Study, University of Tokyo, there is set up a Nuclear Reaction Data File (NRDF) which has been built in Hokkaido University. While the data base is growing year after year, its trial usage is for the purpose of joint utilization by educational institutions. In section 1, examples of the retrieval are presented to have the user familiarize with NRDF. In section 2, the terms used in retrieval are given in table. Then, in section 3, as a summary of the examples, structure of the retrieval commands is explained. In section 4, for the retrieval results on a CRT, cautions in reading are given. Finally, in section 5, general cautions in usage of NRDF are given.

49617 (KEK—84-18) E^+ e^- event generator EPOCS. Kato, Kiyoshi; Munehisa, Tomo. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan); Kogakuin Univ., Tokyo (Japan)). Jan 1985. 100p. (In Japanese). NTIS (US Sales Only), PC A05/MF A01. File Number DE86703221.

We present a Monte Carlo program EPOCS (Electron POsitron Collision Simulator), which generates e^+e^- events in high energy region that will be explored by TRISTAN project. Special emphasis is put on the effect of Z^0 and possible top quark resonances. The user can control the simulation by selecting the energy and other parameters. Also he can easily incorpolate a new process and/or particles into the program. The central part of this report is a detailed description on the structure and the usage of the program. We would like to stress that the hadronization is based on a number of assumptions, which are made as clear as possible here.

49618 (LPC—84-30) Fitting method in a hierarchized parameter problem. Billoir, P. (College de France, 75 - Paris. Lab. de Physique Corpusculaire). 1984. 15p. (In French). NTIS (US Sales Only), PC A02/MF A01. File Number DE86750865.

In some problems one has to perform a least squares fit on a large sample of data, with few general parameters and other ones particular to small data subsets. Examples are given, and a method is proposed to vary all parameters at each iteration (ensuring optimal convergence) while keeping the amount of calculation roughly proportional to the number of parameters.

49619 (PNL-SA—14035) Data analysis management. Cowley, P.J.; Nicholson, W.L.; Carr, D.B. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830. 16p. (CONF-860758—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86013593.

From 13. international biometric conference; Seattle, WA, USA (28 Jul 1986).

Data analysis management is a methodology to assist the analyst in tracking the events of data analysis by allowing the analyst to designate milestones of the analysis, which we call "save-states". A prototype data analysis management system, which is described in this paper, includes capabilities to graphically depict the course of the analysis, the ability to return to previous save-states, the ability to use segments of the log that describe the course of the analysis, and the ability to associate both written and spoken documentation with the analysis. 6 refs., 3 figs.

49620 (SAND—85-0866) Loopback Tester: a synchronous communications circuit diagnostic device. Maestas, J.H. (Sandia National Labs., Albuquerque, NM (USA). Computer Communications Design Div.). Jul 1986. Contract AC04-76DP00789. 70p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE86014935.

The Loopback Tester is an Intel SBC 86/12A Single Board Computer and an Intel SBC 534 Communications Expansion Board configured and programmed to perform various basic or less. These tests include: (1) Data Communications Equipment (DCE) transmit timing detection (2) data rate measurement (3) instantaneous loopback indication and (4) bit error rate testing. It requires no initial setup after plug in, and can be used to locate the source of communications loss in a circuit. It can also be used to determine when crypto variable mismatch problems are the source of communications loss. This report discusses the functionality of the Loopback Tester as a diagnostic device. It also discusses the hardware and software which implements this simple yet reliable device.

49621 (SAND—85-2346) Sandia software guidelines. Volume 3. Standards, practices, and conventions. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1986. Contract AC04-76DP00789. 107p. NTIS, PC A06/MF A01; GPO Dep. File Number DE86015120.

This volume is one in a series of Sandia Software Guidelines intended for use in producing quality software within Sandia National Laboratories. In consonance with the IEEE Standard for Software Quality Assurance Plans, this volume identifies software standards, conventions, and practices. These guidelines are the result of a collective effort within Sandia National Laboratories to define recommended deliverables and to document standards, practices, and conventions which will help ensure quality software. 66 refs., 5 figs., 6 tabs.

49622 (SAND—86-0811) Standard methods for spectral estimation and prewhitening. Stearns, S.D. (Sandia National Labs., Albuquerque, NM (USA). Ground Motion and Seismic Div.). Jul 1986. Contract AC04-76DP00789. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014952.

A standard FFT periodogram-averaging method for power spectral estimation is described in detail, with examples that the reader can use to verify his own software. The parameters that must be specified in order to repeat a given spectral estimate are listed. A standard technique for prewhitening is also described, again with repeatable examples and a summary of the parameters that must be specified.

49623 (SAND—86-1499C) Practical improvements to SIMPR codes for stiff ODEs. Shampine, L.F. (Sandia National Labs., Albuquerque, NM (USA). Numerical Mathematics Div.). 1986. Contract AC04-76DP00789. 22p. (CONF-860759—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE86014140.

From Ordinary differential equations conference (ODE); Albuquerque, NM, USA (28 Jul 1986).

Extrapolation of a semi-implicit midpoint rule (SIMPR) is an effective way to solve stiff initial value problems for a system of ordinary differential equations (ODEs). Two issues peculiar to SIMPR are investigated. It is shown how to improve substantially the robustness and efficiency of SIMPR codes. 16 refs., 4 tabs.

49624 (UCID—19054) Preliminary user's manual for SAPPAC: a multisupport modal time integrator and transfer function plotter for SAP4 models. Goudreau, G.L. (Lawrence Livermore National Lab., CA (USA). Methods Development Group). Jul 1982. Contract W-7405-ENG-48. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86014939.

This computer code is a linear dynamic response routine for SAP4 modal analysis. It is intended for three purposes, (a) to generate plots of the amplitude of the complex transfer function vs frequency for lightly damped structures allowing assessment of spectral sensitivity to modeling complexity, (b) a multi-support excitation capability based on the method of "pseudostatic modes", and (c) efficient modal time integration associated with large modal systems and many response quantities. This latter module (ZIP), is extractable for insertion into the probablistic response code SMACS. Also, this package is simple enough that others might easily extend it. Additional capability now available includes: a vector valued absolute datum acceleration plus relative acceleration multi-support input; rigid base rotation acceleration input (not yet exercised); composite modal damping by element group; inclusion of static response values supplied manually in input; vector magnitude moment response recovery for beams, pipes, and plates; on line spectral acceleration computation without storage of time histories; optional time history dumps for subsequent user supplied plotter; printout of amplitude normalized mode shapes of states too large for SAP4 to print.

49625 (UCRL—53751) Converting scientific software to multiprocessors: a case study. Strout, R.E. II. (Lawrence Livermore National Lab., CA (USA)). 20 Jun 1986. Contract W-7405-ENG-48. 96p. NTIS, PC A05/MF A01; GPO Dep. File Number DE86014751.

This paper examines the process and problems involved in converting an application to make use of these machines. A set of Fortran routines forming an ordinary differential equation solving software package is used as the subject of the work. A set of explicit primitives for concurrent programming, the Cray multitasking primitives, is used as the method for exploiting concurrency on a Cray X-MP/48 supercomputer. Data analysis is discussed as a useful technique in the conversion, and the tools available within the supercomputing environment are examined for their usefulness in performing the data analysis. Two conversions are performed on the software package. First, to allow multiple problems to execute concurrently, and second, to exploit parallelism within each individual problem. The problems involved in each of these conversions are presented with their considered solutions. Performance measurements are presented for each conversion performed. The data analysis procedure was found too complex and time consuming to perform without appropriate tools. More work than expected was required to produce the first conversion. Finally, the largest source of problems is the lack of sufficient support for multiprocessing from the Fortran language. 31 refs., 14 figs.

49626 **(UCRL—92925-Rev.1) Guidelines for the syntactic design of audio cues in computer interfaces. Revision 1.** Sumikawa, D.A.; Blattner, M.M.; Joy, K.I.; Greenberg, R.M. (Lawrence Livermore National Lab., CA (USA); California Univ., Davis (USA)). May 1986. Contract W-7405-ENG-48. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86014429.

Earcons are audio cues used in the computer/user interface to provide information and feedback to the user about computer entities. (Earcons include messages and functions, as well as states and labels.) Design guidelines are presented for the syntax of earcons. Earcons are constructed from pitches, rhythms, and motives, short sequences of notes with a specific rhythm and pitch, embellished by timbre, dynamics, and register. Compound earcons and family earcons are introduced. These are related motives that serve to identify a family of related cues. Examples of earcons are given. 18 refs., 4 figs., 1 tab.

49627 **(UCRL—94377) Interactive wrapper tool for mapping objects to Fortran library functions.** Lawver, B.S. (Lawrence Livermore National Lab., CA (USA)). 1 Apr 1986. Contract W-7405-ENG-48. 11p. (CONF-860967—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE86009686.

From ACM conference on object oriented programming systems, languages, and applications; Portland, OR, USA (29 Sep 1986).

A wrapper serves as a software interface between non-object-oriented software and software that must be used but exists in a form that is not object-oriented. a tool designed to accomplish the wrapping function for a library of Fortran routines used by the Electrical Engineering Department at Lawrence Livermore National Laboratory is described. 7 refs., 6 figs. (DWL)

49628 **The importance of scaling for the Hermite bicubic collocation equations.** Dyksen, W.R.; Rice, J.R. (Dept. of Computer Sciences, Purdue Univ., West Lafayette, IN 47907). 7: No. 3, 707-719(Jul 1986).

It is well known that improper scaling of linear equations can result in catastrophic loss of accuracy from Gauss elimination. The scaling process is not well understood and the commonly used "scaling rules" can fail. The authors study the scaling problem for the linear equations that arise from solving elliptic partial differential equations by collocation using Hermite bicubics. They present an a priori scaling rule that is effective but not foolproof. They conclude that one should use scaled partial pivoting for such equations. They also explore the relationship between the ordering used during Gauss elimination and the underlying geometry of the elliptic problem and conjecture that this ordering must maintain the geometric integrity of the problem in order to avoid severe round-off problems.

49629 **Numerical solution of nonlinear differential equations with algebraic constraints II: Practical implications.** Petzold, L.; Lotstedt, P. (Computing Research and Development Div., Lawrence Livermore National Lab., Livermore, CA 94550). 7: No. 3, 720-733(Jul 1986).

In this paper the authors investigate the behavior of numerical ODE methods for the solution of systems of differential equations coupled with algebraic constraints. Systems of this form arise frequently in the modelling of problems for physics and engineering; they study some particular examples from fluid dynamics and constrained mechanical systems. They investigate some of the practical difficulties of implementing variable-stepsize backward differentiation formulas for the solution of these equations, showing how to overcome problems of matrix ill-conditioning, and giving convergence tests and error tests which are supported by theory.

49630 **Maintaining solution invariants in the numerical solution of ODEs.** Gear, C.W. (Dept. of Computer Science, Univ. of Illinois at Urbana-Champaign, Urbana, IL 61801). 7: No. 3, 734-743(Jul 1986).

Techniques for maintaining the numerical consistency of equality and inequality invariants known to be obeyed by the true solutions of ODEs are discussed. A general framework is used to justify a particular form of his technique for both one-step and multistep methods in the case of equality invariants. This framework can also be used for inequality invariants, but is not satisfactory for multistep methods. However, in a large class of inequality invariants, typified by those arising in chemical kinetic problems, it is shown that the invariant can be satisfied automatically by the numerical method.

49631 **Generalization of Davidson's method for computing eigenvalues of sparse symmetric matrices.** Morgan, R.B.; Scott, D.S. (Mathematics Dept., Univ. of Texas at Austin, Austin, Texas 78712). 7: No. 3, 817-825(Jul 1986).

This paper analyzes Davidson's method for computing a few eigenpairs of large sparse symmetric matrices. An explanation is given for why Davidson's method often performs well but occasionally performs very badly. Davidson's method is then generalized to a method which offers a powerful way of applying preconditioning techniques developed for solving systems of linear equations to solving eigenvalue problems.

49632 **Linear least squares with bounds and linear constraints.** Hanson, R.J. (Sandia National Labs., Albuquerque, NM 87185). 7: No. 3, 826-834(Jul 1986).

An algorithm is given for solving linear least squares systems of algebraic equations subject to simple bounds on the unknowns and (more general) linear equality and inequality constraints. The method used is a penalty function approach wherein the linear constraints are (effectively) heavily weighted. The resulting system is then solved as an ordinary bounded least squares system except for some important numerical and algorithmic details. This report is a revision of an earlier work. It reflects some hard-won experience gained while using the resulting software to solve nonlinear constrained least squares problems.

49633 **Data structures for adaptive grid generation.** Berger, M.J. (Courant Institute of Mathematical Sciences, New York Univ., New York, NY 10012). 7: No. 3, 904-916(Jul 1986).

This paper describes data structures and algorithms for the automatic generation of adaptive subgrids, a technique used with adaptive mesh refinement for solving partial differential equations. Our algorithms generate a nested sequence of finer and finer grids on an underlying coarse grid. There are two aspects to the data structures. Trees are used to do the grid management for this type of grid structure. Secondly, the automatic grid generation algorithms use data structures with special nearest neighbor properties. Examples of grids from actual adaptive numerical computations are shown.

49634 The numerical calculation of traveling wave solutions of nonlinear parabolic equations. Hagstrom, T.; Keller, H.B. (Dept. of Applied Mathematics and Statistics, State Univ. of New York at Stony Brook, Stony Brook, NY 11794). 7: No. 3, 978-988(Jul 1986).

Traveling wave solutions have been studied for a variety of nonlinear parabolic problems. In the initial value approach to such problems the initial data at infinity determines the wave that propagates. The numerical simulation of such problems is thus quite difficult. If the domain is replaced by a finite one, to facilitate numerical computations, then appropriate boundary conditions on the "artificial" boundaries must depend upon the initial data in the discarded region. In this work the authors derive such boundary conditions, based on the Laplace transform of the linearized problems, and illustrate their utility by presenting a numerical solution of Fisher's equation which has been proposed as a model in genetics.

49635 Scientific uses of the MANIAC. Anderson, H.L. (Los Alamos National Laboratory, Los Alamos, New Mexico). 43: No. 3, 731-748(Jun 1986).

This is the story of how Nick Metropolis came to build the MANIAC and about the scientific uses to which it was put in the early days of electronic computing. Among the illustrious scientists attracted to MANIAC were Fermi, Teller, von Neumann, Bethe, Gamow, and Ulam. Many of the scientific contributions were "firsts" that had a profound influence on subsequent developments over a wide spectrum of scientific activities. These included the pion—proton phase shift analysis, the nonlinear coupled oscillators, the study of the genetic code, importance sampling, two-dimensional hydrodynamics, Monte Carlo calculation of nuclear cascades, universalities of iterative functions and "anticlerical" chess.

49636 Mathematics and computing. Lax, P.D. (Los Alamos National Laboratory, Los Alamos, New Mexico). 43: No. 3, 749-756(Jun 1986).

Examples are given of the effects mathematics & computers have had on each other. The relability of computer calculations is discussed. (AIP)

49637 Method for encryption and transmission of digital keying data. Mniszewski, S.M.; Springer, E.A.; Brenner, D.P. (to Dept. of Energy). US Patent Application 6-730,529. 6 May 1985. 16p. Contract W-7405-ENG-36. DE86013712 NTIS, PC A02/MF A01; GPO Dep. File Number DE86013712.

A method for the encryption, transmission, and subsequent decryption of digital keying data is described. The method utilizes the Data Encryption Standard and is implemented by means of a pair of apparatus, each of which is selectable to operate as either a master unit or remote unit. The method enables frequent change of keys without requiring manual entry or storage of keys at the remote unit. 2 figs.

49638 Improved sample size determination for attributes and variables sampling. Stirpe, D.; Picard, R.R. (Los Alamos National Lab., Los Alamos, NM 87545). 14: No. 3, 454-460(1985). (CONF-850765—).

From 26. annual meeting of the Institute of Nuclear Materials Management; Albuquerque, NM, USA (21 Jul 1985).

Earlier INMM paper have addressed the attributes/variables problem and, under conservative/limiting approximations, have reported analytical solutions for the attributes and variables sample sizes. Through computer simulation of this problem, the authors have calculated attributes and variables sample sizes as a function of falsification, measurement uncertainties, and required detection probability without using approximations. Using realistic assumptions for uncertainty parameters of measurement, the simulation results support the conclusions: (1) previously used conservative approximations can be expensive because they lead to larger sample sizes than needed, and (2) the optimal verification strategy, as well as the falsification strategy, are highly dependent on the underlying uncertainty parameters of the measurement instruments.

49639 Activities and trends in physical protection modeling with microcomputers. Chapman, L.D.; Harlan, C.P. (Sandia National Labs., Albuquerque, NM 87185). 14: No. 3, 251-256(1985). (CONF-850765—).

From 26. annual meeting of the Institute of Nuclear Materials Management; Albuquerque, NM, USA (21 Jul 1985).

Sandia National Laboratories developed several models in the mid to late 1970's including the Safeguards Automated Facility Evaluation (SAFE) method. The Estimate of Adversary Sequence Interruption (EASI), the Safeguards Network Analysis Procedure (SNAP), the Brief Adversary Threat Loss Estimator (BATLE), and others. These models were implemented on large computers such as the VAX 11/780 and the CDC machines. With the recent development and widespread use of the IBM PC and other microcomputers, it has become evident that several physical protection models should be made available for use on these microcomputers. Currently, there are programs under way to convert the EASI, SNAP and BATLE models to the IBM PC. The input and analysis using the EASI model has been designed to be very user friendly through the utilization of menu driven options. The SNAP modeling technique will be converted to an IBM PC/AT with many enhancements to user friendliness. Graphical assistance for entering the model and reviewing traces of the simulated output are planned. The BATLE model is being converted to the IBM PC while preserving its interactive nature. The current status of the these developments is reported in this paper.

9903 Information Handling

49640 (KURRI-TR—248, pp 9-21) Features of INIS data base. Ebinuma, Yukio. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). May 1984. (In Japanese). NTIS (US Sales Only), PC A05/MF A01. File Number DE86780483. (CONF-8405416—).

From Meetings on nuclear science information and on-line retrieval; Kumatori, Osaka, Japan (10 May 1984).

The on-line service of INIS atomic energy literature file was started by JOIS on January 5, 1984. This service is to be spread in Japan by the cooperation of the Japan Information Center of Science and Technology having the on-line system in Japan and the Japan Atomic Energy Research Institute having the data base. At the time of starting the service, the features of the INIS data base are outlined from the viewpoint of the utilization. The International Nuclear Information System is the information system supported by the member countries of IAEA and international organizations to offer the secondary information covering the literatures on the peaceful use of atomic energy in the world based on English by computer treatment and to distribute the whole text of special literatures by utilizing microfilm techniques. The INIS has continued the full scale operation since 1973, and now, 70 countries and 14 international organizations take part. As of the end of 1983, about 810,000 secondary informations were collected. The object of the service by JOIS is those of January, 1976, or later. The setup of the INIS, the object of the INIS file, the items of the primary retrieval and the secondary retrieval, answer output, and the experience in JAERI-INIS on-line retrieval system are described.

49641 (KURRI-TR—248, pp 22-26) On INIS atomic energy literature file of JOIS. Kurosawa, Shinji. (Japan Information Center of Science and Technology, Tokyo). May 1984. (In Japanese). NTIS (US Sales Only), PC A05/MF A01. File Number DE86780483. (CONF-8405416—).

From Meetings on nuclear science information and on-line retrieval; Kumatori, Osaka, Japan (10 May 1984).

The International Nuclear Information System (INIS) atomic energy literature file is the file made under IAEA, and the input related to the atomic energy in Japan into this file is carried out by the Japan Atomic Energy Research Institute. Now, the service of offering the information to the users in Japan was to be made by the Japan Information Center of Science and Technology through the on-line system JOIS. The INIS file is old in the world as the data base with the objective of mechanized retrieval, and the data bases set up thereafter followed its pattern. For example, the thesaurus for the purpose of precise information retrieval and the link connecting the relation of words to words were incorporated in the

data base from the beginning. The JICST on-line information system (JOIS) started the service in April, 1976, and offers the service for 13 files. Now, as the 14th, the INIS file was added. The materials since January, 1976, have been collected, and as of 1983, the total number reached about 590,000. As the features of the INIS file, the literatures, books, reports, patents and so on related to the peaceful use of atomic energy are collected. The retrieval of necessary literatures is made on-line by using key words and others. Also secondary retrieval can be utilized.

40642 (KURRI-TR—248, pp 47-54) **Interim report on construction of data base for atomic energy science documents (concerning Kyoto University Reactor).** Takeuchi, Takayuki. (Kyoto Univ., Kumatori, Osaka, Japan. Research Reactor Inst.). May 1984. (In Japanese). NTIS (US Sales Only), PC A05/MF A01. File Number DE86780483. (CONF-8405416—).

From Meetings on nuclear science information and on-line retrieval; Kumatori, Osaka, Japan (10 May 1984).

The Kyoto University Research Reactor Institute was established in 1963 as a research institute for all universities in Japan utilizing the facilities in common. The construction of a document data base has been undertaken in commemoration of the 20th anniversary of the institute. The data base concerns the research works performed at the institute and also the publications and reports on the research made by the personnel belonging to the institute. Input data are gathered from concerned researchers. In this interim report, the structure and contents of this data base are briefly described. One of the features of this data base is that it handles data with both Japanese and English at the same time.

9905 Civilian Defense

40643 (AD-A—167447/2/XAB) **Effects of edge restraint on slab behavior. Final report.** Guice, L.K. (Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Structures Lab.). Feb 1986. 283p. NTIS, PC A13/MF A01.

This study was performed in conjunction with a Federal Emergency Management Agency program to plan, design, and construct keyworker blast shelters which would be used in high-risk areas of the country during and after a nuclear attack. The shelters considered in this study were box-type structures in which damage is much more likely to occur in the roof slab than in the walls or floor. In this part of the program, the effect of edge restraint on slab behavior was investigated. The primary objective was to determine the effects of partial rotational restraint on slab strength, ductility, and mechanism of failure. Sixteen one-way, reinforced concrete plate elements were tested in a reaction structure under uniform static water pressure.

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In the Corporate Author Index, report literature is indexed using the name of the organization or institution responsible for issuing the report. Headings are provided for all report literature and for published literature for which a corporate approach is especially desirable, e.g., symposium and conference proceedings.

Each entry under a corporate heading gives the document title and the volume and abstract numbers. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German, are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes.

DOE Energy Data Base: Corporate Author Entries (DOE/TIC-4585) is used in the standardization of corporate entries. DOE/TIC-4585 is available for purchase from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, Virginia 22161.

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Aarhus Univ. (Denmark). Inst. of Physics
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Aerojet Energy Conversion Co., Sacramento, CA (USA)
System design study to reduce capital and operating cost of a moving distributor, AFB advanced concept - comparison with an oil-fired boiler. Final report, 11:47204 (R;US)

Aeronautical Research Labs., Melbourne (Australia)
Some fundamental studies of metal-induced embrittlement, 11:47909 (R;GB)

Aerospace Corp., El Segundo, CA (USA). Electronics Research Lab.
Amplitude distribution of cosmic ray events in extrinsic IR detectors. Technical report, 11:48958 (R;US)

Aerospace Corp., Los Angeles, CA (USA)
Cosmic ray simulation and testing program. Final Report, January-November 1984, 11:48627 (R;US)

Aerospace Corp., Washington, DC (USA). Electric and Hybrid Vehicle Directorate
Program Management for the US Department of Energy Electric and Hybrid Vehicles Program. Fifty-first monthly progress report, October 1985, 11:47899 (R;US)

AeroVironment, Inc., Monrovia, CA (USA)
HAWT performance with dynamic stall, 11:47472 (R;US)
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Air Force Academy, CO (USA)
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Air Force Weapons Lab., Kirtland AFB, NM (USA)
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Akademie der Wissenschaften der DDR, Berlin. Inst. fuer Mechanik
Results of numerical modelling of non-isothermal flows - flows produced by density gradients, 11:47227 (R;DE;In German)

Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung
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Alabama Univ., University (USA). Dept. of Geology
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Alaska Geological and Geophysical Surveys Div., Juneau (USA)
Geochemistry, isotopic composition and origin of fluids emanating from mud volcanoes in the Copper River Basin, Alaska. Final report, 11:48932 (R;US)

Alaska Univ., Fairbanks (USA). Inst. of Water Resources
Geochemistry, isotopic composition and origin of fluids emanating from mud volcanoes in the Copper River Basin, Alaska. Final report, 11:48932 (R;US)

Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.
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Arizona State Univ., Tempe (USA)
Heat transfer to two-phase air/water mixtures flowing in small tubes with inlet disequilibrium. Final Report, 11:47893 (R;US)

Arizona State Univ., Tempe (USA). Solar Energy Lab.
Open-cycle absorption solar cooling. Part I. Combined heat and mass transfer on an open flow liquid absorbent solar collector/regenerator. Final report, 11:47418 (R;US)
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Armed Forces Radiobiology Research Inst., Bethesda, MD (USA)
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Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Structures Lab.
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Atmospheric and Environmental Research, Inc., Cambridge, MA (USA)
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Auburn Univ., AL (USA). Dept. of Physics
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Australian Atomic Energy Commission Research Establishment, Lucas Heights
[Australian Atomic Energy Commission Research Establishment]. 33rd annual report 1984-1985, 11:47779 (R;AU)

Australian Inst. of Nuclear Science and Engineering, Lucas Heights
10th AINSE radiation biology conference, 22-23 August 1985, Lucas Heights - AINSE Theatre. Conference handbook, 11:48857 (R;AU)

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Bari Univ. (Italy). Ist. di Fisica
Intermediate mass fragment emission from 8 to 40 MeV/u, 11:49323 (R;US)

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Battelle Memorial Inst., Columbus, OH (USA)
Evaluation of calcium impregnated coal as a fuel for turbine combustors. Final report, September 1984-November 1985, 11:47205 (R;US)

Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation
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Baylor Univ., Houston, TX (USA). Coll. of Medicine
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Bechtel Group, Inc., San Francisco, CA (USA)
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Bethlehem Steel Corp., PA (USA)
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Robie House. Phase II report. Recommendations for cooling and ventilation, restoration of doors and windows, refrigerated cooling retrofit, 11:47854 (R;US)
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Conversion of low H_2/CO ratio synthesis gas to hydrocarbons. Progress report, October 1-December 31, 1982, 11:47362 (R;US)
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Fusion nuclear technology development: issues and strategy, 11:49595 (BA;GB)

California Univ., Riverside (USA). Div. of Biomedical Sciences
Tissue interactions with nonionizing electromagnetic fields. Final report, March 1979-February 1986, 11:48928 (R;US)
California Univ., San Diego, La Jolla (USA). Dept. of Physics
Studies of plasma transport relevant to tandem mirrors. Final technical report, March 1, 1982-February 28, 1985, 11:49477 (R;US)
Carbon Resources, Inc., Wheat Ridge, CO (USA)
ChemCoal Process CPU recycle development program with Indian Head lignite. Final report for the period ending March 31, 1986, 11:47152 (R;US)
Carlsen and Fink Associates, Inc., Fairfax, VA (USA)
Integrated power system analysis package: scoping study. Volume 1. Industry survey. Final report, 11:47821 (R;US)
Integrated power system analysis package: scoping study. Volume 2. Software evaluation and integration. Final report, 11:47822 (R;US)
CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)
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Behaviour of cesium 137, chromium 51, cobalt 60, manganese 54, sodium 22 and zinc 65 in simulated estuarine environments. Effects of suspended mineral particles and dissolved organic matters, 11:48759 (R;FR;In French)
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Recherche Technologique et de Developpement Industriel (IRDI)
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Total photon absorption, 11:49339 (R;FR)
CEBAF, Newport News, VA (USA)
Approaching maximal performance of longitudinal beam compression in induction accelerator drivers, 11:48367 (R;US)
Central Electricity Generating Board, Barnwood (UK). Generation Development and Construction Div.
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Central Electricity Generating Board, Bristol (UK). Scientific Services Dept.
Condensate polishers for brackish water-cooled PWRs, 11:47497 (R;US)
Central Electricity Generating Board, Harrogate (UK). Scientific Services Dept.
Performance tests on new electrode materials for hydrogen production by water electrolysis. Final report, 11:47359 (R;DE)
Central Electricity Research Labs., Leatherhead (UK)
Effects of oxygen, copper and acid chlorides on denting corrosion, 11:47499 (R;US)
Prediction of extreme offshore wind speeds at moderate elevations using upper-level wind data , 11:47456 (R;GB)
Centre de Documentation de l'Armement (CEDOCAR), 75 - Paris (France). Direction des Recherches, Etudes et Techniques
Elementary processes and modelling in metallic vapor lasers, 11:48256 (R;FR;In French)
Centre National de la Recherche Scientifique, 13 - Marseille (France). Centre de Physique Theorique
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Centre National de la Recherche Scientifique, 31 - Toulouse (France)
Reduction of radiation damage in solar cells. A study of radiation defects in silicon. Final Report, 11:47391 (R;FR)
Ceskoslovenska Akademie Ved, Prague. Astronomicky Ustav
Star clusters and associations. Physics and evolutions of stars, 11:48970 (R;CS;In English and Russian)
Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu
On the ponderomotive effects at the lower hybrid waves excitation, 11:49488 (R;CS)
Chevron Research Co., Richmond, CA (USA)
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes. Thirteenth interim report, processing of 750 degrees end point Illinois ITSL oil: engineering design studies and estimated processing costs, 11:47147 (R;US)
Chicago Univ., IL (USA)
[Research in the theory of condensed matter and elementary particles.] Progress report, 11:49186 (R;US)
Chicago Univ., IL (USA). Enrico Fermi Inst.
Pathways toward a low cost evacuated collector system, 11:47427 (R;US)
Chloride Silent Power Ltd., Runcorn (UK)
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Cincinnati Univ. Medical Center, OH (USA)
Efficacy of clinical diagnostic procedures utilized in nuclear medicine. Final report, August 1977-November 30, 1983, 11:48802 (R;US)
Cincinnati Univ., OH (USA). Dept. of Physics
^{57}Fe Mossbauer spectroscopy of U_6Fe, 11:47915 (R;US)
Cincinnati Univ., OH (USA). Kettering Lab.
Exploratory research on mutagenic activity of coal-related materials using statistical evaluation, 11:47210 (R;US)
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Large solid angle tracking of Monte Carlo events of heavy ion collisions in TPC magnetic spectrometers, 11:48437 (R;US)
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College of the Holy Cross, Worcester, MA (USA). Dept. of Physics
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Observation of Ti XXI line radiation in ECH plasmas, 11:49486 (R;US)
Columbia Univ., New York (USA)
High-beta plasma research. Task 1: high-beta tokamak research. Task 2: high-beta plasma theory. Annual progress report, 11:49478 (R;US)
Columbia Univ., New York (USA). Radiological Research Lab.
Radiation physics, biophysics, and radiation biology. Progress report, December 1, 1985-November 30, 1986, 11:48829 (R;US)
Commission of the European Communities, Abingdon (UK). JET Joint Undertaking
Analyses of ICRF waves on JET plasmas, 11:49491 (R;GB)
Development of austenitic stainless steels as low-activity structural materials for fusion reactors, 11:49534 (R;GB)
Commission of the European Communities, Ispra (Italy). Joint Research Centre
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Exploitation of the FLK-60 slagging incinerator for different alpha waste streams and study of the feasibility of medium-level alpha-beta-gamma waste incineration in FLK-60, 11:47310 (R;FR)

Commission of the European Communities, Luxembourg. Directorate General Information Market and Innovation
Additional certification of the content (mass fraction) of iodine in two spiked samples of skim milk powder. CRM No. 150-151, 11:48713 (R;DE)
Certification of lead and cadmium in three lyophilized blood materials. CRM No. 194, 195, 196, 11:48060 (R;DE)
Certification of polycyclic aromatic compounds. Pt. 6. CRM Nos. 152, 265, 266, 267, 268, 269, 270, 271, 272, 11:48666 (R;DE)
Certification of the contents (mass fraction) of carbon, hydrogen, nitrogen, chlorine, arsenic, cadmium, manganese, mercury, lead, selenium, vanadium and zinc in three coals. Gas coal CRM No. 180; Coking coal CRM No. 181; Steam coal CRM No. 182, 11:47186 (R;DE)
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Corrosion resistance of nickel and some nickel base alloys in water electrolyzers working at 200°C. Final report, 11:47931 (R;DE;In French)
EXODUS - a program for the economic evaluation of energy exchange opportunities in industrial sites. Final report, 11:47769 (R;DE)
Measurement of precipitation by radar. Cost project 72. Proceedings, 11:48657 (R;DE)
Methane production by anaerobic digestion of algae. Final report, 11:47388 (R;DE)
Methane production by mariculture on land. Final report, 11:47365 (R;DE)
Performance tests on new electrode materials for hydrogen production by water electrolysis. Final report, 11:47359 (R;DE)
Pressurized gasification test facility. Construction. Final report, 11:47390 (R;DE)
Utilization of forest biomass for energy production and industrial purposes. Final report, 11:47389 (R;DE;In Italian)

Connecticut Univ., Storrs (USA). Dept. of Animal Genetics
Embryo culture in teratological surveillance and serum proteins in development. Final technical report, 11:48906 (R;US)

Consultancy Services Wind Energy Developing Countries, Amersfoort (Netherlands)
Cost of windmill irrigation. Cost analysis of wind pumps and diesel pumps used for small scale irrigation, 11:47451 (R;NL)

Copenhagen Univ. (Denmark). H.C. Oersted Inst.
Low-energy heavy-atom impact as a tool for production and classification of doubly excited states, 11:49074 (R;DK)

Corium Industries, Inc., Atlanta, GA (USA)
Sputtering/redeposition analysis of alkali-based tungsten composites for limiter/divertor applications, 11:47934 (R;US)

Cornell Univ., Ithaca, NY (USA). School of Electrical Engineering
Integration methodology for large wind-energy conversion systems. Final report, 11:47462 (R;US)

Council for Mineral Technology, Randburg (South Africa)
Surface-chemical and mineralogical properties relevant to the flotation of talc and other layer silicates, 11:48078 (R;ZA)

Council for Scientific and Industrial Research, Faure (South Africa). National Accelerator Centre
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Dartmouth Coll., Hanover, NH (USA)
Search for metal lines in the spectra of DA white dwarfs. Semiannual Report, 1 October 1984-31 March 1985, 11:49007 (R;US)

Delaware Univ., Newark (USA). Dept. of Chemical Engineering
Enhanced coal liquefaction by pyrolysis in supercritical fluids. Quarterly progress report, April-June 1986, 11:47168 (R;US)

Delegation Generale a la Recherche Scientifique et Technique (DGRST), 75 - Paris (France)
Formation of cenospheres by pyrolysis and oxydative pyrolysis of a monodispersed string of droplets of heavy fuel, 11:47228 (R;FR;In French)

Delphi Research, Inc., Albuquerque, NM (USA)
Hydrogen production with the electrocatalytic oxidation system. Final report, 11:47360 (R;US)

Denver Univ., CO (USA). Dept. of Physics
Detecting and monitoring crack growth in austenitic and ferritic steels. Progress report, 1 December 1985-30 November 1986, 11:47925 (R;US)

Department of Energy, Washington, DC (USA). Office of Fusion Energy
Progress in fusion technology in the U.S. Magnetic Fusion Program, 11:49590 (BA;GB)

Department of Scientific and Industrial Research, Petone (New Zealand). Chemistry Div.
Effects of carbon dioxide attack on geothermal cement grouts, 11:47445 (R;US)

Department of the Environment, London (UK)
Radioactive waste management. The national strategy, 11:47314 (R;GB)

Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)
Investigation on acidity-forming ions in wet and dry deposition during the winter season 1984/85, 11:48664 (R;DE;In German)

Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.). Inst. fuer Physik der Atmosphaere
Investigation on acidity-forming ions in wet and dry deposition during the winter season 1984/85, 11:48664 (R;DE;In German)

Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)
Third international spent fuel storage technology symposium/ workshop: proceedings. Volume 2, 11:47283 (R;US)
Third international spent fuel stroage technology symposium/ workshop: proceedings. Volume 1, 11:47282 (R;US)

Deutsches Atomforum e.V., Bonn (Germany, F.R.)
Annual meeting on nuclear technology 1980. Technical meeting: Man-machine systems. Pt. 1, 11:47610 (R;DE;In German)
Annual meeting on nuclear technology 1981. Technical meeting: Fuel elements and fuel element materials, 11:47629 (R;DE;In German)
Annual meeting on nuclear technology 1982. Technical meeting: Information processing in nuclear engineering, 11:47633 (R;DE;In German)
Annual meeting on nuclear technology 1981. Technical meeting: External impact, 11:47705 (R;DE;In German)
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Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)
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Direccion General de Energia Nuclear, Guatemala City (Guatemala)
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Dravo Corp., Pittsburgh, PA (USA)
Feasibility study for the production of low/medium-Btu gas from coal for Tri-City Regional Port District, 11:47170 (R;US)

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Eagle Research Group, Inc., Arlington, VA (USA)
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East Anglia Univ. (UK). Climatic Research Unit
Detection of CO_2-induced climate change. Progress report, 1 December 1985-15 July 1986, 11:48665 (R;US)
Ecole Centrale des Arts et Manufactures, 92 - Chatenay-Malabry (France)
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EG and G Energy Measurements, Inc., Las Vegas, NV (USA)
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EG and G, Inc., Middletown, PA (USA)
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Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)
Geochemical constraints on the microbial contamination of a hypothetical UK deep geological repository, 11:47312 (R;GB)
Electric Power Research Inst., Palo Alto, CA (USA)
Third international spent fuel storage technology symposium/ workshop: proceedings. Volume 2, 11:47283 (R;US)
Third international spent fuel stroage technology symposium/ workshop: proceedings. Volume 1, 11:47282 (R;US)
Workshop on thermally treated alloy 690 tubes for nuclear steam generators: proceedings, 11:47624 (R;US)
Electrotek Concepts, Inc., Knoxville, TN (USA)
Testing requirements for variable-speed generating technology for wind turbine applications. Final report, 11:47465 (R;US)
ENEA, Casaccia (Italy). Dipartimento Tecnologie Intersettoriali di Base
Applied research performed and in progress by using a TRIGA nuclear reactor, 11:48084 (R;IT)
ENEA, Rome (Italy)
Application of thermal and epithermal neutron activation analysis to rock and sediment samples. Advantages of matrix preseparation for rare earth element determination, 11:48058 (R;IT)
Energy and Environmental Research Corp., Irvine, CA (USA)
Sulfur dioxide emission control by furnace injection of a dry sorbent. Phase III. Economic assessment. Final report, 11:47483 (R;US)
Enerscope, Inc., Glendale, AZ (USA)
Open-cycle absorption solar cooling. Part II. Heat and mass transfer analysis for glazed collector/regeneration. Final report, 11:47419 (R;US)
Open-cycle absorption solar cooling. Part III. Evaluation of air-conditioning systems utilizing liquid absorbents regenerated by solar energy. Final report, 11:47420 (R;US)
Environmental Protection Agency, Cincinnati, OH (USA). Environmental Monitoring and Support Lab.
USEPA (United States Environmental Protection Agency) method study 7. Analyses for trace elements in water by atomic absorption spectroscopy (direct aspiration) and colorimetry. Final report, 11:48755 (R;US)
Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.
Off-site environmental monitoring report. Radiation monitoring around United States nuclear test areas, calendar year 1985, 11:48684 (R;US)
Off-site monitoring for the Mighty Oak nuclear test, 11:48685 (R;US)
Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Monitoring and Systems Lab.
Global atmospheric background monitoring for selected environmental parameters: BAPMON data for 1981: Volume 2. Precipitation chemistry, continuous atmospheric carbon dioxide, and suspended particulate matter, 11:48672 (R;US)
Environmental Protection Agency, Washington, DC (USA). Office of Drinking Water
Report to congress on injection of hazardous waste, 11:47776 (R;US)
Environmental Science and Engineering, Inc., Gainesville, FL (USA)
Installation restoration program: Phase I. Records search, Lawndale Annex, California. Final report, 1 July 1985-31 January 1986, 11:48705 (R;US)
Envirosphere Co., Bellevue, WA (USA)
Cape Blanco Wind Farm feasibility study. Technical Report No. 9. Socioeconomics, 11:47452 (R;US)
Enwright Research Corp., Greenville, SC (USA)
Development of synergistic waste treatment into applied technology, 11:47886 (R;US)
ERNO Raumfahrttechnik G.m.b.H., Bremen (Germany, F.R.)
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Escola Federal de Engenharia de Itajuba, Minas Gerais (Brazil). Inst. Basico
On the equivalence of dilute antiferromagnets and ferromagnets in random external fields: Curie-Weiss models, 11:49440 (R;BR)
European Organization for Nuclear Research, Geneva (Switzerland)
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VMEbus in physics conference. Proceedings, 11:49609 (R;XC)
Exxon Research and Engineering Co., Annandale, NJ (USA)
$(TMTSF)_2PF_6$: evidence for a unified phase diagram, 11:48017 (R;US)

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Fachverband fuer Strahlenschutz e.V., Karlsruhe (Germany, F.R.)
Data compiled by a study group of the managing board on the association's attitude towards issues of radiation protection. Discussion paper, 11:49435 (R;DE;In German)
Fermi National Accelerator Lab., Batavia, IL (USA)
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Fish and Wildlife Service, Cook, WA (USA). Willard Field Station
Feeding activity, rate of consumption, daily ration and prey selection of major predators in John Day Reservoir. Annual report, 11:48781 (R;US)
Fish and Wildlife Service, Slidell, LA (USA). National Wetlands Research Center
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Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico). Black drum, 11:48739 (R;US)
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Florida State Museum, Gainesville (USA)
Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida). Florida pompano, 11:48737 (R;US)
Florida State Univ., Tallahassee (USA). Dept. of Physics
[Research in elementary particle physics]. Progress report, August 1, 1985-July 31, 1986, 11:49122 (R;US)
Florida Univ., Gainesville (USA)
Azimuthal energy flow in deep inelastic neutrino scattering, 11:49124 (R;US)
Ford Aerospace and Communications Corp., Newport Beach, CA (USA)
Tandem thin-film solar cell using Cd/sub y/Zn/sub 1-y/Te as the wide bandgap component. Annual subcontract report, 1 April 1985-1 April 1986, 11:47394 (R;US)
Ford Motor Co., Dearborn, MI (USA)
Ceramic life prediction methodology. Final report, 11:47978 (R;US)
Foster Wheeler Power Products Ltd., London (UK)
Pressurized gasification test facility. Construction. Final report, 11:47390 (R;DE)
Frankfurt Univ. (Germany, F.R.). Fachbereich Humanmedizin
Therapeutic tests on methylcholanthrene-induced fibrosarcoma and transplanted fibrosarcoma of the mouse - clostridial oncolysis and its enhancement by high-frequency hyperthermia and X-rays, 11:48856 (R;DE;In German)
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Freiburg im Breisgau (Germany, F.R.). Inst. fuer Werkstoffmechanik
Development of a thermomechanical measuring procedure for characterizing the material behaviour at fast, ductile fracture, 11:47932 (R;DE;In German)
Freie Univ. Berlin (Germany, F.R.). Fachbereich Physik
Neutron emission in heavy ion reactions as measure for the excitation energy and the transfer of linear momentum - experiments with a 4π-scintillator tank, 11:49352 (R;DE;In German)
Freie Univ. Berlin (Germany, F.R.). Fachbereich Politische Wissenschaft
Preventive environmental policy: Ecological modernisation and structural policy, 11:48783 (R;DE;In German)
Frumerman Associates, Inc., Pittsburgh, PA (USA)
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G

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General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.
Analysis of oil withdrawal and distribution tests for the Strategic Petroleum Reserve, 11:47225 (R;US)
General Electric Co., Cincinnati, OH (USA)
Burner liner thermal/structural load modeling: TRANCITS program user's manual, 11:48323 (R;US)
General Electric Co., Sunnyvale, CA (USA)
Means of manufacturing annular arrays, 11:48319 (P;US)
General Electric Co., Sunnyvale, CA (USA). Nuclear Systems Technology Group
Dissimilar-weld failure analysis and development. Comparative behavior of similar and dissimilar welds. Final report, 11:47926 (R;US)
Geological Survey, Dover, DE (USA). Water Resources Div.
Estimated average annual alkalinity of six streams entering Deep Creek Lake, Garrett County, Maryland. Final report, May 1983-June 1984, 11:48754 (R;US)
Geological Survey, Menlo Park, CA (USA)
Hydrogeochemistry and preliminary reservoir model of the Platanares Geothermal System, Honduras, Central America, 11:47436 (R;US)
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Cygnus experiment at Los Alamos, 11:48608 (R;US)
Georgia Inst. of Tech., Atlanta (USA). Fracture and Fatigue Research Lab.
Remaining-life estimation of boiler pressure parts: crack growth studies. Final report, 11:47927 (R;US)
Georgia Inst. of Tech., Atlanta (USA). Fusion Research Center
3-D transient eddy current calculations for the Felix cylinder experiments, 11:49548 (R;US)
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Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Garching (Germany, F.R.)
System of computer-aided tools supplying data for assessment and prognosis to assist operators to comply with the duty of notification in the event of nuclear emergencies. Final report, 11:47630 (R;DE;In German)
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Koeln (Germany, F.R.)
Reporting criteria for abnormal events at nuclear power plants, 11:47744 (TG;DE)
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)
Intermediate mass fragment emission from 8 to 40 MeV/u, 11:49323 (R;US)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Braunschweig (Germany, F.R.). Inst. fuer Tieflagerung
Radiation protection measurements and environmental monitoring within the area of the Asse mine shaft. Annual report 1984, 11:47313 (R;DE;In German)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz
Dose factors for contamination of skin and clothing, 11:48832 (R;DE;In German)
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Gibbs and Hill, Inc., San Jose, CA (USA)
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Giessen Univ. (Germany, F.R.). Fachbereich Angewandte Biologie und Umweltsicherung
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Operation and maintenance of DOE/PETC combustion test facilities. Quarterly technical progress report, April 1-June 30, 1986, 11:47207 (R;US)
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GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Anlagentechnik
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Alkyl substituted polyphenyls - laser dyes for the augmentation of the efficiency of dye lasers, 11:48260 (R;DE;In German)
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Exploration-production studies in newly drilled Devonian-Shale gas wells. Annual report, February 1, 1985-January 31, 1986, 11:47229 (R;US)
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Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico). Black drum, 11:48739 (R;US)

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Hagler, Bailly and Co., Washington, DC (USA)
Competitive position of natural gas: steel-reheat applications. Topical report, January 1985-May 1986, 11:47232 (R;US)
Hamburg Univ. (Germany, F.R.). Fachbereich Physik
Construction of a time-of-flight neutron spectrometer for reaction angles $0° U/$theta$< = 180°$ and study of the reaction ^{66}Cu(p,xn) ^{66}Zn for Esub(p)=26.7 MeV, 11:48603 (R;DE;In German)
Hamburg Univ. (Germany, F.R.). 2. Inst. fuer Experimentalphysik
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Hamburg Univ. (Germany, F.R.). 2. Inst. fuer Theoretische Physik
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United States Transuranium Registry annual report, October 1, 1984-September 30, 1985, 11:48833 (R;US)
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Hickey (Gene E.) and Associates, Inc., Edina, MN (USA)
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Ultrahigh head pump/turbine development program. Volume 1. Technical summary. Final report, 11:47379 (R;US)
Houston Univ., TX (USA). Dept. of Mechanical Engineering
Design of an acousto-optic goniometric specimens mount. Report No. 2 on modeling of acoustic microscopes, 11:48293 (R;US)
Hughes Research Labs., Malibu, CA (USA)
Long life nickel electrodes for a nickel-hydrogen cell: cycle life tests, 11:47754 (R;US)
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Superlattices and NiPi structures in new forms of cascade solar cells. Semiannual Report, 23 October 1985-22 April 1986, 11:47392 (R;US)

Illinois Univ., Urbana (USA). Dept. of Chemical Engineering
Thermodynamic properties for supercritical coal conversion. Quarterly progress report, April 1-June 30, 1986, 11:47165 (R;US)
Illinois Univ., Urbana (USA). Dept. of Computer Science
Automated reference librarians for program libraries and their interaction with language based editors, 11:49612 (R;US)
Illinois Univ., Urbana (USA). Dept. of Theoretical and Applied Mechanics
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Simple waves in quasilinear hyperbolic systems. Part 1. Theory of simple waves and simple states. Examples of applications, 11:49453 (R;PL)
Institute of Electrical and Electronics Engineers, Inc., New York (USA)
IEEE Transactions on Nuclear Science. 1985 particle accelerator conference: accelerator engineering and technology. Volume NS-32, No. 5. Part 1, 11:48329 (R;US)
Institute of Gas Technology, Chicago, IL (USA)
High-temperature composite thermal energy storage for solar applications. Draft. Final report, 11:47433 (R;US)
Microbial removal of organic sulfur from coal. Third quarterly report, April-June 1986, 11:47169 (R;US)
Institute of Nuclear Physics, Krakow (Poland)
Assessment of the radiation risk following from exploitation of Polish brown coals. Part 1. Brown coal in Polish industry; preparation of the method of determining the concentrations of main natural radioisotopes appearing in brown coal and its combustion products, 11:48697 (R;PL;In Polish)
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Institut Francais du Petrole 1984. Annual progress report, 11:47213 (R;FR;In French)
Institut fuer Angewandte Oekologie e.V., Freiburg im Breisgau (Germany, F.R.)
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International Atomic Energy Agency, Vienna (Austria)
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Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy
Periodic amplitude variations in Jovian continuum radiation. Progress report for period ending February 1986, 11:48959 (R;US)
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Iraq Atomic Energy Commission, Baghdad
[Iraqi Atomic Energy Commission]. Annual report 1982-1983, 11:47778 (R;IQ)

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Japan Chemical Analysis Center, Chiba
Radioactivity survey data in Japan, 11:48723 (R;JP)

Jerry L. Pettis Memorial Veterans Administration Medical Center, Loma Linda, CA (USA)
Tissue interactions with nonionizing electromagnetic fields. Final report, March 1979-February 1986, 11:48928 (R;US)

Jet Propulsion Lab., Pasadena, CA (USA)
Telecommunications and Data Acquisition Report. Progress report, October-December 1985, 11:49598 (R;US)

Jones and Jones, Seattle, WA (USA)
Cape Blanco Wind Farm feasibility study. Technical Report No. 8. Land use, 11:47453 (R;US)

Junta de Energia Nuclear, Madrid (Spain)
PETOS-Basic programs for treating data and reporting results in atomic spectroscopy, 11:48077 (R;ES;In Spanish)

Jyvaeskylae Univ. (Finland). Dept. of Physics
Deep-lying νhsub(11/2) hole states in ^{145}Nd, 11:49324 (R;NO)

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Kansas Univ. Center for Research, Inc., Lawrence (USA)
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements. Final Report, 11:47894 (R;US)

Karlsruhe Univ. (T.H.) (Germany, F.R.). Bibliothek
List of publications of the University of Karlsruhe and the Karlsruhe Nuclear Research Centre. Publications of 1984, 11:49600 (R;DE;In German)

Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Maschinenbau
Oxidation and creep behaviour of dense silicon nitride materials with different compositions, 11:47981 (R;DE;In German)

Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Physik
Electron cooling for low-energy antiprotons, 11:48390 (R;DE;In German)
Initialisation method for numerical mesoscale flow models, 11:48658 (R;DE;In German)

Kentucky Univ., Lexington (USA). Dept. of Chemical Engineering
Sulfide precipitation of nickel and other heavy metals from single- and multi-metal systems. Final report, 11:48751 (R;US)

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^{57}Fe Mossbauer spectroscopy of U_6Fe, 11:47915 (R;US)
Physical and chemical properties of graphite intercalation compounds. Progress report, August 1, 1985-October 31, 1986, 11:48020 (R;US)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)
Precipitation and phase stability of solid Kr in cavities after room-temperature implantation of Al. Revision, 11:47923 (R;US)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung
Determination of the acoustical phonon dispersion branches of $CePd_3$ by inelastic neutron diffraction, 11:47945 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe
Study of surfaces and surface layers on high temperature materials after short-time thermal loads, 11:49555 (R;DE)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik
Charge radii and moments of tin nuclei by laser spectroscopy, 11:49322 (R;DE)
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Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung
Oxidation and creep behaviour of dense silicon nitride materials with different compositions, 11:47981 (R;DE;In German)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Literaturabteilung
List of publications of the University of Karlsruhe and the Karlsruhe Nuclear Research Centre. Publications of 1984, 11:49600 (R;DE;In German)

Knolls Atomic Power Lab., Schenectady, NY (USA)
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Kogakuin Univ., Tokyo (Japan)
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Komenskeho Univ., Bratislava (Czechoslovakia). Matematicko-Fyzikalna Fakulta
Low radioactivities '85. (The 7th Nuclear Science Colloquium). Program and abstracts, 11:48559 (R;CS)

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Kyoto Univ., Uji (Japan). Plasma Physics Lab.
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Lawrence Berkeley Lab., CA (USA)
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Shellfish depuration by gamma irradiation. Progress report No. 1, October 1, 1985-July 25, 1986, 11:47351 (R;US)
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Management and Technical Services Co., Library, PA (USA)
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Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.)
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Michigan State Univ., East Lansing (USA). Div. of Engineering Research
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Advanced propulsion systems and alternative fuels for non-highway transportation. Annex and compendium of research and development. [Final report. Volume 3], 11:47868 (R;US)
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National Bureau of Standards, Boulder, CO (USA). Fracture and Deformation Div.
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National Bureau of Standards, Boulder, CO (USA). Thermophysics Div.
Thermophysical properties of fluids for the gas industry. Annual report, January-December 1985, 11:47366 (R;US)

National Bureau of Standards, Washington, DC (USA)
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National Bureau of Standards, Washington, DC (USA). Polymers Div.
Reference standard polyethylene resins and piping materials. Annual report, October 1, 1984-September 30, 1985, 11:47236 (R;US)

National Geophysical Data Center, Boulder, CO (USA)
Solar-Geophysical Data Number 499, March 1986. Part 2 (comprehensive reports). Data for September 1985, and miscellanea, 11:49011 (R;US)
Solar-Geophysical Data Number 499, March 1986. Part 1 (prompt reports). Data for February 1986, January 1986, and late data, 11:49010 (R;US)
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National Inst. for Petroleum and Energy Research, Bartlesville, OK (USA)
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National Inst. of Radiological Sciences, Chiba (Japan)
Annual report of National Institute of Radiological Sciences, April, 1982-March, 1983, 11:47780 (R;JP)
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National Ocean Service, Anchorage, AK (USA). Ocean Assessments Div.
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National Research Council, Washington, DC (USA). Committee on Electricity in Economic Growth
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National Research Council, Washington, DC (USA). Transportation Research Board
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Analysis of the performance of a vertically oriented, gas-loaded, variable-conductance heat pipe. Master's thesis, 11:48276 (R;US)

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Advanced concepts theory: annual report, 1985. Memorandum report, January-December 1985, 11:49470 (R;US)
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GAMBLE-II imploding sodium plasma. 2. Uniformly filled z-pinch. Memorandum report, October 1985-February 1986, 11:49098 (R;US)

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Effects of dynamic strain on crack tip chemistry. Volume 1. Tests using a segmented artificial crevice. Final report, 11:47930 (R;US)

New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center
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New Mexico State Univ., Las Cruces (USA). Dept. of Mechanical Engineering
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New Mexico State Univ., Las Cruces (USA). New Mexico Solar Energy Inst.
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Behaviour of cesium 137, chromium 51, cobalt 60, manganese 54, sodium 22 and zinc 65 in simulated estuarine environments. Effects of suspended mineral particles and dissolved organic matters, 11:48759 (R;FR;In French)
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Low-rank coal liquefaction mechanisms. Final report for the period ending March 31, 1986, 11:47150 (R;US)
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Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control
Title List of Documents Made Publicly Available, June 1-30, 1986. Volume 8, No. 6, 11:47609 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Waste Management
De Minimis waste impacts analysis methodology. IMPACTS - BRC user's guide and methodology for radioactive wastes below regulatory concern. Draft report for comment. Volume 2, 11:47341 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation
Integrated plant safety assessment, Systematic Evaluation Program. La Crosse Boiling Water Reactor (Docket No. 50-409). Supplement No. 1, 11:47723 (R;US)
Safety Evaluation Report related to the operation of Clinton Power Station, Unit No. 1 (Docket No. 50-461). Supplement No. 6, 11:47724 (R;US)
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Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research
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Fission cross section measurement of ^{245}Cm and ^{246}Pu. Final report, June 1, 1984-June 30, 1986, 11:49361 (R;US)
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Sandia National Labs., Albuquerque, NM (USA). Seabed Programs Div.
In situ heat transfer experiment (ISHTE): Ocean Test Cruise report (Alcyone Cruise, Leg IV) September 1985, 11:48956 (R;US)

Sandia National Labs., Albuquerque, NM (USA). Simulation Theory Div.
Recent developments in discrete-ordinates electron transport, 11:47622 (R;US)

Sandia National Labs., Albuquerque, NM (USA). Technology Transfer and Management Dept.
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Sandia National Labs., Livermore, CA (USA)
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Sandia National Labs., Livermore, CA (USA). Electronic Subsystems Div.
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Sao Paulo Univ. (Brazil). Inst. de Fisica
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School of Aerospace Medicine, Brooks AFB, TX (USA)
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Science Applications International Corp., McLean, VA (USA)
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Scripps Institution of Oceanography, La Jolla, CA (USA)
Geochemistry, isotopic composition and origin of fluids emanating from mud volcanoes in the Copper River Basin, Alaska. Final report, 11:48932 (R;US)

Security State Bank, Wells, MN (USA)
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Service Central de Protection contre les Rayonnements Ionisants, 78 - Le Vesinet (France)
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Single-Ply Inst. of America, Inc., Pasadena, MD
Photovoltaic membrane (PVM) roof system. Second quarter technical progress report, 1986, 11:47387 (R;US)

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Southwest Research Inst., San Antonio, TX (USA). Fuels and Lubricants Research Div.
DOE Synthetic Fuel Center monthly progress report No. 9, 1-30 July 1986, 11:47902 (R;US)
SRI International, Menlo Park, CA (USA)
Elementary processes in the catalytic combustion of methane (mechanism, intermediates, and controlling reactions). Final report, October 1981-December 1985, 11:47239 (R;US)
Staatliche Materialpruefungsanstalt, Stuttgart (Germany, F.R.)
Materials analyses for the case of additive creep and fatigue - proposed calculation. Final report, 11:47912 (R;DE;In German)
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Effect of energy feedback mechanisms on the oxidation rate of pulverized coal. Quarterly technical report, March 1-May 31, 1986, 11:47206 (R;US)
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Unusual initial and final state effects in quantum chromodynamics. Final report, July 15, 1983-July 14, 1986, 11:49184 (R;US)
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State Univ. of New York, Stony Brook (USA). Dept. of Psychiatry and Behavioral Science
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State Univ. of New York, Stony Brook (USA). Research Foundation
Operation, maintenance and upgrading of SUNY facilities at the National Synchrotron Light Source. Final report, 1 October 1980-31 May 1986, 11:48382 (R;US)
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Vacuum ultraviolet electronic properties of liquids. Eighteen year progress report, November 1, 1968-January 31, 1987, 11:49099 (R;US)
Terra Tek, Inc., Salt Lake City, UT (USA)
Multiple-fracture stimulation using controlled pulse pressurization. Final report, March 1983-December 1985, 11:47233 (R;US)
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Texas A and M University Nuclear Science Center. Twenty-second progress report, January 1-December 31, 1985, 11:47645 (R;US)
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Advanced heat-pipe heat exchanger and microprocessor-based modulating burner controls development. Annual report, January 1985-January 1986, 11:47238 (R;US)
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Occidental vertical modified in situ process for the recovery of oil from oil shale, Phase 2. Construction, operation, testing, and environmental impact. Final report, August 1981-December 1982. Volume 1, 11:47244 (R;US)
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Tulane Univ., New Orleans, LA (USA). Dept. of Environmental Health Sciences
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Schneider hydrodynamic power generator prototype installation, test and evaluation. Volume 1. Final report, 11:47376 (R;US)
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The notations in the final parentheses indicate the type of document, e.g., R for Report; the country of publication, e.g., US; and the language if other than English, e.g., In German. Tables of document types and country of publication codes appear after the indexes.

The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processes applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in a document, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept (e.g., Pipeline Quality Gas, see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. To complete an exhaustive search of a given subject, all such headings should be reviewed. Copies of DOE/TIC-7000, the Subject Thesaurus, are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, VA 22161.

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Assessment of development and production potential of federal coal leases. Volume 2. Working papers. Part E, Vol. 1. Development and production potential of undeveloped federal coal leases and preference-right lease applications in the Powder River Basin and other Wyoming coal basins: Wyoming task force report. Working paper, 11:47208 (R;US)
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Improved catalysts for liquid hydrocarbon fuels from syngas. Sixth quarterly technical progress report, January-March 1986, 11:47363 (R;US)

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Prior to November 1980, this concept was indexed to CO-GENERATION.
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Integrated natural-gas-engine cooling-jacket vapor-compressor program. Annual report (Phase 1A), February 1985-October 1985, 11:47240 (R;US)

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Prior to March, 1976, the descriptors COMBINED CYCLES and FOSSIL-FUEL POWER PLANTS or THERMAL POWER PLANTS were used for indexing this concept.
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Prior to October 1982, this concept was indexed to THERMONUCLEAR DEVICES or to a particular experiment if known, e.g., REVERSE-FIELD PINCH.
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Multiple-fracture stimulation using controlled pulse pressurization. Final report, March 1983-December 1985, 11:47233 (R;US)

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Elementary processes and modelling in metallic vapor lasers, 11:48256 (R;FR;In French)
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Production
Full scale experimental anaerobic fermentation facility. Final report for design, construction, and operation, 11:47361 (R;US)
Methane production by mariculture on land. Final report, 11:47365 (R;DE)
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Geologic and reservoir characteristics of the Red Mountain coalbed-methane test site in the Piceance Basin. Topical report, April 15, 1983-January 31, 1986, 11:47235 (R;US)
Preliminary economic assessment potential for producing coalbed methane for the multiple coal seams completion project at Rock Creek. Topical report, March 1983-May 1986, 11:47234 (R;US)
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Low-energy process for separating coal gasification products. Final report, 11:47155 (R;US)
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Thermophysical properties of fluids for the gas industry. Annual report, January-December 1985, 11:47366 (R;US)
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[Mountain States Energy Division, Inc.] Quarterly technical progress report, April 1-June 30, 1986, 11:47826 (R;US)
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Installation restoration program. Phase II. Confirmation/quantification. Stage I report for Williams Air Force Base, Chandler, Arizona. Final report, September 1984-January 1986, 11:48706 (R;US)
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Bibliographies

Title List of Documents Made Publicly Available, June 1-30, 1986. Volume 8, No. 6, 11:47609 (R;US)

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Participation in the United States Department of Energy Reactor Sharing Program. Annual report, September 1982-August 1983, 11:47650 (R;US)

UWNR REACTOR

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	11:47656	BNL-NUREG—37691
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	11:48056	BNL—38365
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	Pennsylvania State Univ., University Park (USA). Soil Microbiology Lab.	
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	11:48045	Journal of the American Ceramic Society 69 NO. 5. 396-399 (May 1986).
	11:48140	Journal of the American Chemical Society 108 NO. 17. 5113-5116 (20 Aug 1986).
	11:48148	Journal of Catalysis 100 NO. 1. 196-209 (Jul 1986).
	11:48150	Journal of Catalysis 100 NO. 1. 210-218 (Jul 1986).
	11:48151	Journal of Physical Chemistry 90 NO. 13. 3005-3009 (19 Jun 1986).
	11:48152	Journal of Physical Chemistry 90 NO. 13. 3009-3013 (19 Jun 1986).
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	11:49085	Journal of Chemical Physics 85 NO. 4. 1971-1976 (15 Aug 1986).
	11:49086	Journal of Chemical Physics 85 NO. 4. 2328-2329 (15 Aug 1986).
	11:49093	43 NO. 3. 1017-1026 (Jun 1986).
	Lawrence Berkeley Lab., CA (USA)	
	11:49129	LBL—21716
	11:49154	LBL—21695
	Lawrence Berkeley Lab., CA (USA). Nuclear Science Div.	
	11:49261	LBL—21650
	11:49353	LBL—21580
	Lawrence Berkeley Lab., CA (USA)	
	11:49412	LBL—21462
	11:49443	34 NO. 4. 2920-2922 (15 Aug 1986).
	11:49444	57 NO. 2. 242-244 (14 Jul 1986).
	11:49512	3 NO. 3. 1239-1240 (May-Jun 1985).
AC03-76SF00515	**Stanford Linear Accelerator Center, Menlo Park, CA (USA)**	
	11:48336	DOE/SF/00515—T65
	11:48345	SLAC-PUB—3936
	11:48346	SLAC-PUB—3981
	11:48347	SLAC-PUB—3985
	11:48348	SLAC-PUB—4013
	11:48361	SLAC-PUB—3935
	11:48362	SLAC-PUB—3965
	11:48363	SLAC-PUB—3977
	11:48364	SLAC-PUB—3979
	11:48400	SLAC/AP—51
	11:48401	SLAC-CN—334
	11:48402	SLAC-PUB—3940
	11:48403	SLAC-PUB—3945
	11:48405	247 NO. 2. 301-303 (15 Jun 1986).
	11:48614	SLAC-PUB—3968
	Michigan Univ., Ann Arbor (USA)	
	11:48615	SLAC-PUB—3980
	Stanford Linear Accelerator Center, Menlo Park, CA (USA)	
	11:48616	SLAC-PUB—4017
	11:48617	SLAC-PUB—4020
	11:49131	SLAC—300
	11:49132	SLAC-PUB—4026
	11:49160	SLAC-PUB—4001
	11:49161	SLAC-PUB—4029
	11:49162	SLAC-TN—86-3
	11:49198	34 NO. 2. 612-618 (15 Jul 1986).
	11:49207	269 NO. 3/4. 509-529 (9 Jun 1986).
	11:49216	172 NO. 2. 227-230 (15 May 1986).
	11:49413	SLAC-PUB—3973
	11:49455	SLAC-PUB—4008
AC03-79ER10483	**SRI International, Menlo Park, CA**	
	11:48194	Journal of the American Chemical Society 102 NO. 24. 7400-7402 (1980).
AC03-80SF11508	**Univ. of Wisconsin, Madison**	
	11:47425	Journal of Heat Transfer 102 111-116 (Feb 1980).
AC03-81SF11564	**Stanford Univ., CA (USA). Petroleum Research Inst.**	
	11:47217	DOE/SF/11564—17
AC03-83SF11930	**Wisconsin Univ., Madison (USA). Solar Energy Lab.**	
	11:47429	DOE/SF/11930—1
AC03-83SF11936	**Institute of Gas Technology, Chicago, IL (USA)**	
	11:47433	DOE/SF/11936—T1
AC03-84ER53158	**GA Technologies, Inc., San Diego, CA (USA)**	
	11:49487	GA-A—18454
	11:49552	GA-A—18455
AC03-84SF12223	**Arizona State Univ., Tempe (USA). Solar Energy Lab.**	
	11:47418	ERC-R—86020A
	11:47419	ERC-R—86020B
	11:47420	ERC-R—86020C
	11:47421	ERC-R—86020D
AC03-85SF15774	**Stroud, Inc., Arvada, CO (USA)**	
	11:47855	DOE/SF/15774—T1
AC04-76DP00053	**Pacific Northwest Lab., Richland, WA (USA)**	
	11:47332	CONF-841187—Vol.1(Apr 1985).
	Monsanto Research Corp., Miamisburg, OH (USA). Mound	
	11:47904	MLM—3363
	11:48079	MLM—3362
	Monsanto Research Corp., Miamisburg, OH (USA)	
	11:48650	MLM—3380(OP)
	Pacific Northwest Lab., Richland, WA (USA)	
	11:48788	CONF-841187—Vol.1(Apr 1985).
AC04-76DP00613	**Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.**	
	11:48299	BDX—613-3510
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (USA). In Situ Technologies Div.**	
	11:47243	SAND—86-1858C
	Sandia National Labs., Albuquerque, NM (USA)	
	11:47349	SAND—86-1695C
	11:47438	SAND—86-1126C
	11:47439	SAND—86-1127C
	11:47441	SAND—85-2809
	11:47442	SAND—86-1120C

Contract No.	Abstract No.	Report No.
	11:47443	SAND—86-1128C
	11:47444	SAND—86-2023C
	New Mexico Univ., Albuquerque (USA). Inst. for Space Nuclear Power Studies	
	11:47530	CONF-860102—Summs.(1986).
	Los Alamos National Lab., NM (USA). Applied Theoretical Physics Div.	
	11:47622	SAND—86-0335C
	California Univ., Los Angeles (USA). School of Engineering and Applied Science	
	11:47678	EPRI-NP—4455(Mar 1986).
	11:47686	EPRI-NP—4455(Mar 1986).
	Sandia National Labs., Albuquerque, NM (USA)	
	11:47738	SAND—84-1341
	11:47755	SAND—86-7115C
	11:47951	SAND—86-0809C
	11:48024	SAND—86-0824C
	11:48025	SAND—86-1381C
	11:48026	SAND—86-1601C
	11:48027	SAND—86-1701C
	11:48030	Applied Physics Letters 49 NO. 9. 489-491 (1 Sep 1986).
	11:48032	Applied Physics Letters 49 NO. 8. 475-477 (25 Aug 1986).
	11:48252	14 NO. 3. 357-362 (1985).
	New Mexico State Univ., Las Cruces (USA). Dept. of Mechanical Engineering	
	11:48283	SAND—84-1563
	11:48287	57 NO. 9. 2266-2273 (Sep 1986).
	Sandia National Labs., Albuquerque, NM (USA). Nondestructive Testing Technology Div.	
	11:48292	SAND—86-0046
	Sandia National Labs., Albuquerque, NM (USA)	
	11:48309	SAND—86-0845C
	11:48310	SAND—86-1600C
	11:48314	Journal of Applied Physics 60 NO. 6. 2137-2141 (15 Sep 1986).
	11:48315	Applied Physics Letters 49 NO. 8. 461-463 (25 Aug 1986).
	11:48316	Journal of Applied Physics 60 NO. 3. 1216-1217 (1 Aug 1986).
	11:48325	SAND—86-1084C
	11:48344	SAND—86-1722C
	11:48358	SAND—86-1539C
	11:48359	SAND—86-1654C
	Sandia National Labs., Albuquerque, NM (USA). Directed Energy Research Dept.	
	11:48360	SAND—86-1748C
	Sandia National Labs., Albuquerque, NM (USA). Monitoring Systems Div.	
	11:48613	SAND—86-1473
	Sandia National Labs., Albuquerque, NM (USA)	
	11:48634	SAND—86-1544C
	11:48635	SAND—86-1606
	11:48644	(18 Jul 1985).
	Unidynamics, Phoenix, AZ (USA)	
	11:48651	SAND—86-2045
	Sandia National Labs., Albuquerque, NM (USA). Seabed Programs Div.	
	11:48956	SAND—86-0829
	Minnesota Univ., Minneapolis (USA). Dept. of Chemistry	
	11:49080	SAND—86-1751C
	11:49442	34 NO. 4. 2112-2115 (15 Aug 1986).
	11:49505	57 NO. 9. 2283-2293 (Sep 1986).
	Sandia National Labs., Albuquerque, NM (USA)	
	11:49568	SAND—86-1706C
	Sandia National Labs., Albuquerque, NM (USA). Technology Transfer and Management Dept.	
	11:49599	SAND—86-2068
	Sandia National Labs., Albuquerque, NM (USA). Computer Communications Design Div.	
	11:49620	SAND—85-0866
	Sandia National Labs., Albuquerque, NM (USA)	
	11:49621	SAND—85-2346
	Sandia National Labs., Albuquerque, NM (USA). Ground Motion and Seismic Div.	
	11:49622	SAND—86-0811
	Sandia National Labs., Albuquerque, NM (USA). Numerical Mathematics Div.	
	11:49623	SAND—86-1499C
AC04-76DR00789	**Resource Analysis International, Inc., Los Angeles, CA (USA)**	
	11:47407	SAND—85-8184
	Sandia National Labs., Livermore, CA (USA)	
	11:47408	SAND—86-8002
	11:47409	SAND—86-8011
	11:47952	SAND—86-8231
	Sandia National Labs., Livermore, CA (USA). Electronic Subsystems Div.	
	11:48308	SAND—85-8025
AC04-76EV01013	**Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM**	
	11:48822	Federation Proceedings, Federation of American Societies for Experimental Biology 45 NO. 3
AC04-82AL21362	**RANN, Inc., Palo Alto, CA (USA)**	
	11:47457	DOE/AL/21362—T1
AC05-76ER04207	**Texas A and M Univ., College Station (USA). Texas Engineering Experiment Station**	
	11:47645	DOE/ER/04207—18
AC05-76OR00001	**Goodyear Atomic Corp., Piketon, OH (USA)**	
	11:47344	GAT-NM—137
AC05-76OR00033	**Oak Ridge Associated Universities, Inc., TN (USA)**	
	11:47774	ORAU—262
	Northwestern Univ., Evanston, IL (USA)	
	11:47820	DOE/OR/00033—T202
AC05-84OR21400	**Oak Ridge National Lab., TN (USA)**	
	11:47142	ORNL/FMP—86/2
	11:47171	ORNL/FETEP—14
	11:47172	ORNL/FMP—86/5
	11:47173	ORNL/TM—10066
	Oak Ridge National Lab., TN (USA). Engineering Physics and Mathematics Div.	
	11:47274	ORNL/TM—8999
	Oak Ridge National Lab., TN (USA). Fuel Recycle Div.	
	11:47305	CONF-860820—4
	Oak Ridge National Lab., TN (USA)	
	11:47306	CONF-8609117—1
	11:47316	ORNL/TM—10002
	11:47484	CONF-8609118—1
	Massachusetts Inst. of Tech., Cambridge (USA). High Voltage Research Lab.	
	11:47488	ORNL/Sub—80-7979
	Oak Ridge National Lab., TN (USA)	
	11:47489	ORNL/TM—9596
	11:47493	NUREG/CR—4367-Rev.1
	11:47518	ORNL—6301
	11:47598	CONF-8506153—1
	Tennessee Univ., Knoxville (USA). Construction Resources Analysis	
	11:47616	ORNL/Sub—85-7685/1-11
	Oak Ridge National Lab., TN (USA). Engineering Technology Div.	
	11:47617	ORNL/TM—10071

Contract No.	Abstract No.	Report No.
	Oak Ridge National Lab., TN (USA). Engineering Physics and Mathematics Div.	
	11:47621	ORNL/TM—9860
	Oak Ridge National Lab., TN (USA). Instrumentation and Controls Div.	
	11:47665	CONF-860204—39
	Oak Ridge National Lab., TN (USA)	
	11:47667	CONF-860610—2
	11:47668	CONF-860932—1
	11:47728	NUREG/CR—4255-Vol.3-No.1
	11:47736	ORNL/CSD/TM—231
	11:47737	ORNL/TM—10094
	11:47832	CONF-860901—1
	Argonne National Lab., IL (USA). Materials Science and Technology Div.	
	11:47921	CONF-860605—24
	Oak Ridge National Lab., TN (USA)	
	11:47922	CONF-860752—1
	Oak Ridge National Lab., TN (USA). Metals and Ceramics Div.	
	11:47924	CONF-8609101—1
	11:47954	34 NO. 4. 2246-2252 (15 Aug 1986).
	11:47962	57 NO. 2. 269-269 (14 Jul 1986).
	11:47965	57 NO. 1. 150-153 (7 Jul 1986).
	Oak Ridge National Lab., TN (USA)	
	11:47976	CONF-8609120—1
	11:47987	34 NO. 4. 2757-2761 (15 Aug 1986).
	11:47991	Journal of the American Ceramic Society 69 NO. 5. c95-c97 (May 1986).
	11:47993	Journal of the American Ceramic Society 69 NO. 5. c93-c94 (May 1986).
	11:47994	Journal of the American Ceramic Society 69 NO. 5. c101-c103 (May 1986).
	11:47996	62 NO. 3. 371-376 (May 1986).
	Massachusetts Inst. of Tech., Cambridge (USA)	
	11:48010	ORNL/Sub—84-9009/2
	11:48034	34 NO. 4. 2407-2415 (15 Aug 1986).
	Oak Ridge National Lab., TN (USA)	
	11:48081	ORNL/TM—9950
	11:48195	ORNL/tr—86/28288 324-332 (1956).
	11:48235	NE-F—3-42-7-86
	11:48236	NE-F—3-43-7-86
	11:48237	NE-F—3-44-7-86
	11:48238	ORNL/TM—9889
	11:48250	(16 Apr 1985).
	11:48290	CONF-860856—1
	11:48301	CONF-860755—1
	11:48409	CONF-860575—20
	11:48647	(23 Apr 1985).
	Oak Ridge National Lab., TN (USA). Environmental Sciences Div.	
	11:48704	CONF-8605167—1
	Oak Ridge National Lab., TN (USA)	
	11:48732	ORNL/ESH—1/V19
	Pacific Northwest Lab., Richland, WA (USA)	
	11:48744	CONF-841187—Vol.2(Apr 1985).
	11:48818	Journal of Bacteriology 164 NO. 1. 57-62 (Oct 1985).
	Oak Ridge National Lab., TN (USA)	
	11:48898	CONF-8508192—1
	Oak Ridge National Lab., TN (USA). Environmental Sciences Div.	
	11:48903	CONF-860949—1
	11:48915	Federation Proceedings, Federation of American Societies for Experimental Biology 45 NO. 3
	11:48919	Environmental Mutagenesis 8 NO. 3. 357-367 (1986).
	11:48925	Environmental Health Perspectives 62 223-226 (Oct 1985).
	Oak Ridge National Lab., TN (USA)	
	11:48938	ORNL/TM—9678
	Tennessee Univ., Knoxville (USA). Dept. of Physics	
	11:49068	CONF-8606166—1
	Oak Ridge National Lab., TN (USA)	
	11:49077	ORNL—6293
	11:49084	34 NO. 4. 2088-2096 (15 Aug 1986).
	11:49090	57 NO. 1. 74-77 (7 Jul 1986).
	11:49092	34 NO. 1. 97-102 (Jul 1986).
	11:49292	ORNL/TM—9964
	11:49354	34 NO. 2. 429-442 (Aug 1986).
	11:49356	34 NO. 1. 45-59 (Jul 1986).
	11:49357	56 NO. 22. 2360-2363 (2 Jun 1986).
	11:49366	93 NO. 1. 31-42 (May 1986).
	Oak Ridge National Lab., TN (USA). Physics Div.	
	11:49384	CONF-8505189—5
	11:49385	CONF-8606183—1
	11:49386	CONF-8606183—2
	Oak Ridge National Lab., TN (USA)	
	11:49437	ORNL—6296
	11:49445	57 NO. 1. 126-129 (7 Jul 1986).
	11:49446	34 NO. 1. 343-346 (1 Jul 1986).
	11:49454	ORNL/TM—10034
	11:49475	CONF-8510266—5
	11:49476	CONF-8510266—6
	Oak Ridge National Lab., TN (USA). Fusion Energy Div.	
	11:49494	ORNL/TM—9520
	Oak Ridge National Lab., TN (USA)	
	11:49495	ORNL/TM—9703
	11:49508	Journal of Computational Physics 65 NO. 2. 253-272 (Aug 1986).
	Oak Ridge National Lab., TN (USA). Fusion Engineering Design Center	
	11:49537	CONF-860652—12
	Oak Ridge National Lab., TN (USA)	
	11:49542	CONF-8510266—1
	11:49543	CONF-8510266—2
	Oak Ridge National Lab., TN (USA). Fusion Energy Div.	
	11:49544	CONF-8510266—3
	11:49545	CONF-8510266—4
	Oak Ridge National Lab., TN (USA)	
	11:49546	CONF-8605139—3
	11:49547	CONF-8606179—Vol.2
	Oak Ridge National Lab., TN (USA). Fusion Engineering Design Center	
	11:49564	ORNL/FEDC—86/3
	11:49565	ORNL/FEDC—86/4
	Oak Ridge National Lab., TN (USA). Fusion Energy Div.	
	11:49566	ORNL/TM—9992
	11:49582	57 NO. 9. 2356-2358 (Sep 1986).
	Oak Ridge National Lab., TN (USA). Center for Engineering Systems Advanced Research	
	11:49610	CONF-860963—1
AC05-84OS21400	**Oak Ridge Y-12 Plant, TN (USA)**	
	11:48225	Y/CM—0008
	11:48296	Y/DW—642
AC05-84OT21400	**Virginia Univ., Charlottesville (USA). Dept. of Nuclear Engineering and Engineering Physics**	
	11:48630	K/TS—11-771
AC06-65RL01837	**Hanford Environmental Health Foundation, Richland, WA (USA)**	
	11:48833	HEHF—54-85
AC06-76FF02170	**Hanford Engineering Development Lab., Richland, WA (USA)**	
	11:47491	HEDL—7591
	11:47935	HEDL-SA—3423-FP
	11:47979	HEDL—7560

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	11:47980	HEDL—7577
AC06-76RL01830	Pacific Northwest Lab., Richland, WA (USA)	
	11:47175	PNL—5375
	11:47300	CONF-841187—Vol.1(Apr 1985).
	11:47301	CONF-841187—Vol.1(Apr 1985).
	11:47302	CONF-841187—Vol.1(Apr 1985).
	11:47318	PNL—5830
	11:47319	PNL—5919
	11:47328	CONF-841187—Vol.1(Apr 1985).
	11:47329	CONF-841187—Vol.1(Apr 1985).
	11:47334	CONF-841187—Vol.1(Apr 1985).
	11:47367	PNL-SA—13853
	11:47381	PNL-SA—13422
	11:47469	PNL—5857
	11:47470	PNL—5903
	New Mexico Univ., Albuquerque (USA). Inst. for Space Nuclear Power Studies	
	11:47557	CONF-860102—Summs.(1986).
	Pacific Northwest Lab., Richland, WA (USA)	
	11:47599	PNL—5906
	11:47600	PNL-SA—13751
	11:47644	PNL—5870
	11:47726	NUREG/CR—3262-Vol.2
	11:47858	PNL-SA—13260
	11:47985	PNL—5915
	11:48088	11 NO. 7. 422-424 (Jul 1986).
	11:48154	Journal of Physical Chemistry 90 NO. 13. 3022-3026 (19 Jun 1986).
	11:48210	PNL—5948
	11:48611	PNL-SA—13220
	11:48678	CONF-841187—Vol.1(Apr 1985).
	11:48682	CONF-841187—Vol.2(Apr 1985).
	Arizona Univ., Tucson (USA). Lab. of Tree-Ring Research	
	11:48734	DOE/RL/01830—T46
	Pacific Northwest Lab., Richland, WA (USA)	
	11:48745	CONF-841187—Vol.2(Apr 1985).
	11:48897	PNL-SA—13454
	11:48910	PNL—5764
	11:48911	PNL-SA—13923
	11:48916	Environmental Health Perspectives 65 45-48 (Mar 1986).
	11:49306	PNL-SA—14160
	11:49619	PNL-SA—14035
AC06-81ER40048	Washington Univ., Seattle (USA). Nuclear Physics Lab.	
	11:49123	DOE/ER/40048—163-L6
	Washington Univ., Seattle (USA). Dept. of Physics	
	11:49182	DOE/ER/40048—28-N6
	11:49183	DOE/ER/40048—29-N6
	11:49219	DOE/ER/40048—26-N6
	Washington Univ., Seattle (USA). Nuclear Physics Lab.	
	11:49349	DOE/ER/40048—162
AC07-76ID01570	EG and G, Inc., Middletown, PA (USA)	
	11:47284	EGG-M-T—0286
	Pacific Northwest Lab., Richland, WA (USA)	
	11:47336	CONF-841187—Vol.2(Apr 1985).
	Idaho National Engineering Lab., Idaho Falls (USA)	
	11:47440	EGG-M—10286
	New Mexico Univ., Albuquerque (USA). Inst. for Space Nuclear Power Studies	
	11:47533	CONF-860102—Summs.(1986).
	EG and G Idaho, Inc., Idaho Falls (USA)	
	11:47647	EGG-M—22985
	11:47727	NUREG/CR—3453
	11:47958	Applied Optics 25 NO. 14. 2248-2248 (15 Jul 1986).
	11:48129	(5 Mar 1985).
	11:48281	EGG-J—01586
	11:48291	EGG-M—06485
	11:48442	EGG-M—08185
	11:49300	EGG-M—15186
	11:49551	EGG-M—01286
AC07-78ID01745	Mountain States Energy, Inc., Butte, MT (USA)	
	11:47826	DOE/ID/01745—T10
AC07-84ID12502	Enwright Research Corp., Greenville, SC (USA)	
	11:47886	DOE/ID/12502—1
AC07-84ID12539	United Technologies Research Center, East Hartford, CT (USA)	
	11:47887	DOE/ID/12539—T1
AC08-76NV00410	Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV (USA)	
	11:48880	NVO—232-Rev.3
AC08-80CS50101	Aerospace Corp., Washington, DC (USA). Electric and Hybrid Vehicle Directorate	
	11:47899	DOE/CS/50101—T15
AC08-83NV10282	EG and G Energy Measurements, Inc., Las Vegas, NV (USA)	
	11:49615	EGG—10282-1114
AC09-76SR00001	Pacific Northwest Lab., Richland, WA (USA)	
	11:47195	CONF-841187—Vol.2(Apr 1985).
	11:47304	CONF-841187—Vol.2(Apr 1985).
	Savannah River Lab., Aiken, SC (USA)	
	11:47308	DP—1722
	11:47309	DPST—84-537
	Pacific Northwest Lab., Richland, WA (USA)	
	11:47642	CONF-841187—Vol.2(Apr 1985).
	11:47643	CONF-841187—Vol.2(Apr 1985).
	Savannah River Lab., Aiken, SC (USA)	
	11:47651	DPST—85-1-11
	11:47652	DPST—86-1-1
	Pacific Northwest Lab., Richland, WA (USA)	
	11:48227	CONF-841187—Vol.2(Apr 1985).
	11:48746	CONF-841187—Vol.2(Apr 1985).
AC09-76SR00819	Savannah River Ecology Lab., Aiken, SC	
	11:48913	American Journal of Public Health 76 NO. 5. 328-335 (May 1986).
AC11-76PN00014	Bettis Atomic Power Lab., West Mifflin, PA (USA)	
	11:47519	WAPD-TM—1555
	Westinghouse Electric Corp., West Mifflin, PA (USA)	
	11:48248	(5 Aug 1985).
AC12-76SN00052	Knolls Atomic Power Lab., Schenectady, NY (USA)	
	11:48606	KAPL—4193
AC21-81MC16426	New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center	
	11:47216	DOE/MC/16426—19
AC21-82MC19207	Massachusetts Inst. of Tech., Cambridge (USA)	
	11:47154	DOE/MC/19207—2133
AC21-83MC20183	State Univ. of New York, Buffalo (USA). Dept. of Chemical Engineering	
	11:47155	DOE/MC/20183—2074
AC21-84FC10616	Energy and Environmental Research Corp., Irvine, CA (USA)	
	11:47483	DOE/FC/10616—2130

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AC21-84MC21048	Frumerman Associates, Inc., Pittsburgh, PA (USA)	
	11:47156	DOE/MC/21048—2067
AC21-84MC21171	Aerojet Energy Conversion Co., Sacramento, CA (USA)	
	11:47204	DOE/MC/21171—2069
AC21-84MC21289	Battelle Memorial Inst., Columbus, OH (USA)	
	11:47205	DOE/MC/21289—2064
AC21-84MC21377	Scientific Design Co., Inc., New York (USA)	
	11:47157	DOE/MC/21377—2155
	11:47158	DOE/MC/21377—2156
	11:47159	DOE/MC/21377—2158
	11:49614	DOE/MC/21377—2154
AC22-76ET10532	Chevron Research Co., Richmond, CA (USA)	
	11:47147	DOE/ET/10532—T32
AC22-78ET13011	Management and Technical Services Co., Library, PA (USA)	
	11:47203	DOE/ET/13011—T1
AC22-83PC62999	Cincinnati Univ., OH (USA). Kettering Lab.	
	11:47210	DOE/PC/62999—10
AC22-84PC70028	Union Carbide Corp., Tarrytown, NY (USA). Molecular Sieve Dept.	
	11:47363	DOE/PC/70028—T7
AC22-85PC71504	Gilbert/Commonwealth, Inc., Reading, PA (USA)	
	11:47207	DOE/PC/71504—5
AC22-85PC80023	Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering	
	11:47167	DOE/PC/80023—T5
AC22-85PC81201	Institute of Gas Technology, Chicago, IL (USA)	
	11:47169	DOE/PC/81201—T3
AC79-80BP22849	Washington Univ., Seattle (USA)	
	11:47474	(4 Jan 1985).
AC79-83BP11191	Envirosphere Co., Bellevue, WA (USA)	
	11:47452	DOE/BP/11191—9
	Jones and Jones, Seattle, WA (USA)	
	11:47453	DOE/BP/11191—8
	USDOE Bonneville Power Administration, Portland, OR	
	11:47454	DOE/BP/11191—10
	Michigan Univ., Ann Arbor (USA). Dept. of Electrical Engineering and Computer Science	
	11:47458	DOE/BP/11191—5
AC79-83BP11548	USDOE Bonneville Power Administration, Portland, OR. Office of Power and Resources Management	
	11:47380	DOE/BP/11548—1
AI01-76ET20320	Toledo Univ., OH (USA)	
	11:47459	DOE/NASA—0005-3
AI01-76ET32016	Naval Research Lab., Washington, DC	
	11:48132	Chemical Physics Letters 48 NO. 1. 119-121 (15 May 1977).
AI01-79ET29078	Jerry L. Pettis Memorial Veterans Administration Medical Center, Loma Linda, CA (USA)	
	11:48928	DOE/ET/29078—T2
AI05-82OR21005	National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center	
	11:48328	DOE/NASA—1005-9
AI05-84OR21411	Ford Motor Co., Dearborn, MI (USA)	
	11:47978	DOE/OR/21411—T1
AI08-76DP00539	Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.	
	11:48684	DOE/DP/00539—056
	11:48685	DOE/DP/00539—057
AI79-82BP34796	Fish and Wildlife Service, Cook, WA (USA). Willard Field Station	
	11:48781	DOE/BP/34796—1
AS03-76EV70156	Univ. of California, Berkeley	
	11:48921	Environmental Mutagenesis 8 NO. 1. 9-28 (1986).

Contract No.	Abstract No.	Report No.
AS05-76ER03509	Florida State Univ., Tallahassee (USA). Dept. of Physics	
	11:49122	DOE/ER/03509—22
AS05-76ER03992	Texas Univ., Austin (USA). Center for Particle Theory	
	11:49146	DOE/ER/03992—557
	11:49147	DOE/ER/03992—567
	11:49148	DOE/ER/03992—568
	11:49179	DOE/ER/03992—554
	11:49180	DOE/ER/03992—561
	11:49181	DOE/ER/03992—578
AS05-76ER04447	Univ. of Tennessee, Knoxville	
	11:48193	Advances in Inorganic Chemistry and Radiochemistry 28 29-72 (1984).
AS05-78ET52025	Corium Industries, Inc., Atlanta, GA (USA)	
	11:47934	GTFR—65
	Georgia Inst. of Tech., Atlanta (USA). Fusion Research Center	
	11:49548	DOE/ET/52025—T4
AS05-79ER10361	Texas A & M Univ., College Station	
	11:47448	16 181-198 (1983).
AS05-80ER10706	Texas Univ., Austin (USA). Dept. of Physics	
	11:49255	DOE/ER/10706—T1
AS05-80ER10742	Brookhaven National Lab., Upton, NY (USA). Applied Science Dept.	
	11:48629	BNL—38364
AS05-81ER10936	Univ. of Cincinnati, OH	
	11:48168	52 NO. 7. 675-679 (1984).
AS05-82ER13015	Univ. of Maryland, College Park	
	11:48821	80 NO. 4. 25 (Apr 1986).
AS05-83ER13124	Rice Univ., Houston, TX (USA). Dept. of Geology and Geophysics	
	11:48930	DOE/ER/13124—2
AS19-82BC10744	Texas Univ., Austin (USA)	
	11:47215	DOE/BC/10744—8
AS20-82LC10916	Wyoming Geological Survey, Laramie (USA)	
	11:47241	DOE/LC/10916—1984
AT03-78SF70030	General Electric Co., Sunnyvale, CA (USA)	
	11:48319	(10 Oct 1985).
AT03-82ER12016	Stanford Univ., CA (USA). Dept. of Applied Earth Sciences	
	11:48135	DOE/ER/12016—1
AT03-82ER53129	California Univ., San Diego, La Jolla (USA). Dept. of Physics	
	11:49477	DOE/ER/53129—T1
AT03-82SF11682	California Univ., Berkeley (USA)	
	11:47446	DOE/SF/11682—T1
AT06-80ER10680	Univ. of Washington, Seattle	
	11:48814	Journal of Bacteriology 166 NO. 2. 591-597 (May 1986).
	11:48815	Journal of Bacteriology 166 NO. 2. 581-590 (May 1986).
FC02-80CS30353	Weidt (John) Associates, Inc., Minneapolis, MN (USA)	
	11:47417	DOE/CS/30353—2
FC07-78RA01699	Idaho Falls, City of, ID (USA)	
	11:47378	DOE/RA/01699—5
FC07-80ID12155	Turlock Irrigation District, CA (USA)	
	11:47376	DOE/ID/12155—T1
	11:47377	DOE/ID/12155—T2
FC07-85NV10412	Texas Univ., Austin (USA). Center for Energy Studies	
	11:47447	UT/CES-GR—5
FC20-79LC10036	Occidental Oil Shale, Inc., Grand Junction, CO (USA)	
	11:47244	DOE/LC/10036—2009-Vol.1
	11:47245	DOE/LC/10036—2009-Vol.2
	11:47246	DOE/LC/10036—2009-Vol.3
FC21-83FE60177	Western Research Inst., Laramie, WY (USA)	
	11:47247	DOE/FE/60177—2152
FC21-83FE60181	North Dakota Univ., Grand Forks (USA). Energy Research Center	
	11:47149	DOE/FE/60181—2084
	11:47150	DOE/FE/60181—2085
	11:47151	DOE/FE/60181—2086

Contract No.	Abstract No.	Report No.
	11:47152	DOE/FE/60181—2087
	11:47153	DOE/FE/60181—2095
	11:47180	DOE/FE/60181—2093
	11:47181	DOE/FE/60181—2094
	11:47182	DOE/FE/60181—2096
	11:47197	DOE/FE/60181—2091
FC22-83FE60149	National Inst. for Petroleum and Energy Research, Bartlesville, OK (USA)	
	11:47218	NIPER—170
	11:47223	NIPER—178
	11:47373	NIPER—101
FG01-78ET11384	Yale Univ., New Haven, CT	
	11:49107	74 617-626 (1981).
FG01-82CE40568	Tulane Univ., New Orleans, LA (USA). Dept. of Environmental Health Sciences	
	11:48321	DOE/CE/40568—T1
FG01-85CE15239	Single-Ply Inst. of America, Inc., Pasadena, MD	
	11:47387	DOE/CE/15239—T3
FG02-81ER10229	Wisconsin Univ., Madison (USA). Nuclear Reactor Lab.	
	11:47646	DOE/ER/10229—23
FG02-84CH10198	Arizona State Univ., Tempe	
	11:47396	Journal of the American Chemical Society 108 NO. 17. 5350-5352 (20 Aug 1986).
FG02-84CH10206	Oregon State Univ., Corvallis (USA). Wind Resources Assessment Lab.	
	11:47449	DOE/CH/10206—T1
FG02-84CH10211	Tuskegee Inst., AL (USA). Carver Research Foundation	
	11:47352	DOE/CH/10211—5
FG02-84ER40165	Rensselaer Polytechnic Inst., Troy, NY (USA). Gaerttner LINAC Lab.	
	11:49360	DOE/ER/40165—1
	Rensselaer Polytechnic Inst., Troy, NY (USA)	
	11:49361	DOE/ER/40165—4
FG02-84ER45079	Northeastern Univ., Boston, MA (USA)	
	11:49438	DOE/ER/45079—T1
FG02-84ER45097	Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering	
	11:47977	DOE/ER/45097—T2
FG02-84ER45142	Minnesota Univ., Minneapolis (USA). School of Physics and Astronomy	
	11:47903	DOE/ER/45142—3
FG02-84ER45144	Chicago Univ., IL (USA)	
	11:49186	DOE/ER/45144—T2
FG02-84ER53188	Missouri Univ., Rolla (USA). Dept. of Physics	
	11:49069	DOE/ER/53188—T1
FG02-84ER53189	GA Technologies, Inc., San Diego, CA (USA)	
	11:49486	GA-A—18227
FG02-84ER60214	Cold Spring Harbor Lab., NY (USA)	
	11:48929	(1985).
FG02-84ER60246	Ohio State Univ. Research Foundation, Columbus (USA)	
	11:48733	DOE/ER/60246—1
FG02-85ER13385	Illinois Institute of Technology, Chicago	
	11:48145	Journal of Physical Chemistry 90 NO. 16. 3492-3495 (31 Jul 1986).
FG02-85ER40233	Northwestern Univ., Chicago, IL (USA)	
	11:49185	DOE/ER/40233—T1
FG02-85ER40238	Institute of Electrical and Electronics Engineers, Inc., New York (USA)	
	11:48329	CONF-850504—Pt.1
FG02-85ER45182	Denver Univ., CO (USA). Dept. of Physics	
	11:47925	DOE/ER/45182—2
FG02-85ER45189	Michigan Univ., Ann Arbor (USA). Dept. of Physics	
	11:49439	DOE/ER/45189—1
FG02-85ER53208	Department of Astronomy, Pennsylvania State University University Park, Pennsylvania 16802 Los Alamo	
	11:49081	Atomic Data and Nuclear Data Tables 35 NO. 2. 223-266 (Sep 1986).
FG02-86ER53222	Columbia Univ., New York (USA)	
	11:49478	DOE/ER/53222—T1
FG02-86ER60397	East Anglia Univ. (UK). Climatic Research Unit	
	11:48665	DOE/ER/60397—1
FG02-86ER60402	Columbia Univ., New York (USA). Radiological Research Lab.	
	11:48829	DOE/ER/60402—1
FG03-84CE30805	Burt-Hill-Kosar-Rittelmann Associates, Washington, DC (USA)	
	11:47854	DOE/CE/30805—T1
FG03-85ER13431	California Institute of Technology, Pasadena	
	11:48173	Journal of the American Chemical Society 108 NO. 17. 5347-5349 (20 Aug 1986).
FG03-86ER52130	California Univ., Los Angeles (USA). Dept. of Mechanical, Aerospace and Nuclear Engineering	
	11:49498	UCLA/PPG—917
FG04-84AL27458	Lowell Univ., MA (USA). Radiation Lab.	
	11:47351	DOE/AL/27458—T1
FG05-80ER10733	Virginia Univ., Charlottesville (USA). Research Labs. for the Engineering Sciences	
	11:47650	UVA—527277/NEEP84/102
FG05-80ET53088	Texas Univ., Austin (USA). Inst. for Fusion Studies	
	11:49479	DOE/ET/53088—2
	11:49480	DOE/ET/53088—230
	11:49481	DOE/ET/53088—237
	11:49482	DOE/ET/53088—239
	11:49483	DOE/ET/53088—240
	11:49484	DOE/ET/53088—244
FG05-84ER45151	Kentucky Univ., Lexington (USA). Dept. of Physics and Astronomy	
	11:48020	DOE/ER/45151—2
FG05-85ER13414	North Carolina Univ., Chapel Hill (USA). Dept. of Geology	
	11:48945	DOE/ER/13414—1
FG05-85ER25010	Texas Univ., Austin (USA). Dept. of Computer Sciences	
	11:49613	DOE/ER/25010—T1
FG05-86ER60393	Louisiana State Univ., Baton Rouge (USA). Dept. of Zoology and Physiology	
	11:48828	DOE/ER/60393—1
FG05-86ER60415	Tennessee Univ., Knoxville (USA). Dept. of Physics and Astronomy	
	11:49099	DOE/ER/60415—2
FG06-80R000484	Port Townsend, City of, OR (USA)	
	11:47460	DOE/R0/00484—T1
FG06-81R001242	Beck (William), Pullman, WA (USA)	
	11:47461	DOE/R0/01242—T1
FG06-85ER40201	Oregon Univ., Eugene (USA)	
	11:49150	DOE/ER/40201—1
FG07-84ID12524	Alaska Geological and Geophysical Surveys Div., Juneau (USA)	
	11:48932	DOE/ID/12524—T1
FG09-85ER60376	North Carolina State Univ., Raleigh (USA). Dept. of Marine, Earth and Atmospheric Sciences	
	11:48931	DOE/ER/60376—12b
FG22-80PC30226	Univ. of Utah, Salt Lake City	
	11:47190	ACS Symposium Series 79-97 (1984).
	11:47191	Fuel 62 601-605 (May 1983).
FG22-81PC40795	California Univ., Berkeley (USA). Dept. of Chemical Engineering	
	11:47362	DOE/PC/40795—T3
FG22-82PC50798	Colorado Univ., Boulder (USA)	
	11:47162	DOE/PC/50798—T14

Contract No.	Abstract No.	Report No.
FG22-82PC50800	**Univ. of Illinois, Urbana**	
	11:48178	Journal of Physical Chemistry 90 NO. 17. 4210-4215 (14 Aug 1986).
FG22-82PC50807	**Duke Univ., Durham, NC**	
	11:48181	Journal of the American Chemical Society 108 NO. 16. 4888-4896 (6 Aug 1986).
FG22-82PC50812	**Univ. of Utah, Salt Lake City**	
	11:48709	5 NO. 3. 121-129 (1983).
FG22-83PC60779	**Allied-Signal, Inc., Des Plaines, IL (USA). Engineered Materials Research Center**	
	11:48136	DOE/PC/60779—T2
FG22-84PC70003	**Pennsylvania State Univ., University Park (USA). Coll. of Earth and Mineral Sciences**	
	11:47198	DOE/PC/70003—T10
FG22-84PC70782	**Illinois Univ., Urbana (USA)**	
	11:47183	DOE/PC/70782—7
FG22-84PC70786	**State Univ. of New York, Binghamton (USA)**	
	11:47163	DOE/PC/70786—T6
FG22-84PC70791	**Purdue Univ., Lafayette, IN (USA). Dept. of Chemistry**	
	11:47164	DOE/PC/70791—T5
	11:47184	DOE/PC/70791—T4
FG22-84PC70794	**Stanford Univ., CA (USA). High Temperature Gasdynamics Lab.**	
	11:47206	DOE/PC/70794—7
FG22-84PC70801	**Illinois Univ., Urbana (USA). Dept. of Chemical Engineering**	
	11:47165	DOE/PC/70801—T7
FG22-84PC70809	**University of Southern California, Los Angeles (USA)**	
	11:47364	DOE/PC/70809—T10
FG22-84PC71257	**Pittsburgh Univ., PA (USA)**	
	11:47166	DOE/PC/71257—T7
FG22-85PC80509	**Delaware Univ., Newark (USA). Dept. of Chemical Engineering**	
	11:47168	DOE/PC/80509—T3
FG22-85PC80533	**Oklahoma Univ., Norman (USA). School of Chemical Engineering and Materials Science**	
	11:47185	DOE/PC/80533—T3
W-31-109-ENG-38	**Argonne National Lab., IL (USA)**	
	11:47146	CONF-860608—7
	11:47201	CONF-860535—2
	11:47372	CONF-860405—6
	11:47427	CONF-860655—14
	11:47428	CONF-860655—15
	11:47494	NUREG/CR—4503-Vol.1
	11:47510	CONF-860501—14
	Argonne National Lab., IL (USA). Components Technology Div.	
	11:47511	CONF-8510282—1
	New Mexico Univ., Albuquerque (USA). Inst. for Space Nuclear Power Studies	
	11:47572	CONF-860102—Summa.(1986).
	Argonne National Lab., IL (USA)	
	11:47666	CONF-860501—15
	Argonne National Lab., IL (USA). Reactor Analysis and Safety Div.	
	11:47735	NUREG/CR—4657
	Argonne National Lab., IL (USA). Chemical Technology Div.	
	11:47750	CONF-860688—5
	Argonne National Lab., IL (USA). Magnetohydrodynamics Program	
	11:47824	CONF-860663—1
	11:47825	CONF-860663—3
	Cincinnati Univ., OH (USA). Dept. of Physics	
	11:47915	CONF-860602—6
	Argonne National Lab., IL (USA). Materials Science and Technology Div.	
	11:47916	CONF-860605—19
	11:47917	CONF-860605—20
	Argonne National Lab., IL (USA)	
	11:47918	CONF-860605—21
	Argonne National Lab., IL (USA). Materials Science and Technology Div.	
	11:47919	CONF-860605—22
	Argonne National Lab., IL (USA)	
	11:48014	CONF-860608—4
	Argonne National Lab., IL (USA). Materials Science and Technology Div.	
	11:48015	CONF-860608—5
	Argonne National Lab., IL (USA)	
	11:48016	CONF-860608—6
	11:48018	CONF-8606133—7
	11:48053	Acta Crystallographica, Section C: Crystal Structure Communications C40 1715-1717 (1984).
	11:48054	Journal of the American Chemical Society 106 NO. 24. 7644-7646 (1984).
	11:48057	CONF-860921—1
	11:48143	Journal of Physical Chemistry 90 NO. 16. 3470-3482 (31 Jul 1986).
	11:48185	Journal of Physical Chemistry 90 NO. 16. 3673-3683 (31 Jul 1986).
	11:48189	Journal of Physical Chemistry 90 NO. 13. 2974-2987 (19 Jun 1986).
	11:48202	Journal of the American Chemical Society 108 NO. 16. 4706-4710 (6 Aug 1986).
	11:48327	ANL-CT—86-1
	11:48353	CONF-860575—35
	11:48376	ANL-HEP-CP—86-74
	11:48381	CONF-8605131—2
	Fermi National Accelerator Lab., Batavia, IL (USA)	
	11:48435	ANL-HEP-CP—86-32
	Argonne National Lab., IL (USA)	
	11:48436	ANL-HEP-CP—86-40
	11:48440	CONF-8604103—1
	Pacific Northwest Lab., Richland, WA (USA)	
	11:48711	CONF-841187—Vol.1(Apr 1985).
	Argonne National Lab., IL (USA)	
	11:48824	ANL/EES-TM—308
	11:48905	CONF-8606161—1
	Argonne National Lab., IL (USA). High Energy Physics Div.	
	11:48962	ANL-HEP-CP—86-39
	Argonne National Lab., IL (USA)	
	11:49113	ANL-HEP-CP—86-47
	11:49114	ANL-HEP-CP—86-76
	11:49136	34 NO. 1. 19-41 (1 Jul 1986).
	11:49165	57 NO. 3. 294-297 (21 Jul 1986).
	11:49197	34 NO. 2. 571-584 (15 Jul 1986).
	11:49206	270 NO. 2. 155-168 (16 Jun 1986).
	11:49531	ANL/FPP/TM—205
	Argonne National Lab., IL (USA). Fusion Power Program	
	11:49538	CONF-860652—20
	Argonne National Lab., IL (USA)	
	11:49539	CONF-860652—21
	Argonne National Lab., IL (USA). Fusion Power Program	
	11:49540	CONF-860652—22
	11:49541	CONF-860652—23
	McDonnell Douglas Astronautics Co., St. Louis, MO (USA)	
	11:49549	DOE/NBM—1053
	Argonne National Lab., IL (USA). Mathematics and Computer Science Div.	
	11:49604	ANL/MCS-TM—73
	11:49606	ANL/MCS-TM—77
	11:49607	ANL/MCS-TM—78

Contract No.	Abstract No.	Report No.
W-7405-ENG-26	**Oak Ridge National Lab., TN**	
	11:48196	Journal of Physics, D (London). Applied Physics 17 L73-L76 (1984).
W-7405-ENG-36	**Los Alamos National Lab., NM (USA)**	
	11:47315	LA—10732-MS
	11:47338	LA—10768-MS
	11:47345	LA—10672-C
	11:47382	(30 Apr 1985).
	11:47434	LA—10634-MS
	11:47435	LA-UR—86-2009
	11:47436	LA-UR—86-1404
	11:47508	NUREG/CR—4526
	National Research Council, Washington, DC (USA). Committee on Electricity in Economic Growth	
	11:47819	DOE/NBM—6014858
	Los Alamos National Lab., NM (USA)	
	11:47946	LA—10753-T
	11:48138	LA—10681
	11:48170	LA-UR—86-2181
	11:48222	LA—10788-MS
	11:48229	LA-UR—86-1076
	11:48230	LA-UR—86-2352
	11:48231	LA-UR—86-2371
	11:48232	LA-UR—86-2378
	11:48233	LA-UR—86-2507
	Vanderbilt Univ., Nashville, TN (USA). Dept. of Physics and Astronomy	
	11:48258	LA-UR—86-2542
	Los Alamos National Lab., NM (USA)	
	11:48297	LA-UR—86-2396
	11:48304	LA-UR—86-2372
	11:48305	LA-UR—86-2379
	11:48306	LA-UR—86-2387
	11:48307	LA-UR—86-2412
	11:48391	LA—10599
	11:48394	LA-UR—86-2388
	11:48406	(20 May 1985).
	11:48607	LA-UR—86-2413
	Maryland Univ., College Park (USA)	
	11:48608	LA-UR—86-2590
	Los Alamos National Lab., NM (USA)	
	11:48621	(30 Apr 1985).
	11:48622	(9 Apr 1985).
	11:48623	(5 Mar 1985).
	Los Alamos National Lab., NM (USA). Applied Theoretical Physics Div.	
	11:48631	LA-UR—86-2637
	Los Alamos National Lab., NM (USA)	
	11:48645	(21 Jun 1985).
	11:48646	(30 Apr 1985).
	Los Alamos National Lab., NM (USA). Theoretical Div.	
	11:48823	LA-UR—86-1596
	Los Alamos National Lab., NM (USA)	
	11:48947	LA-UR—86-2581
	11:49004	LA-UR—86-2350
	Rollins Coll., Winter Park, FL (USA). Dept. of Physics	
	11:49067	CONF-8606157—2
	Vanderbilt Univ., Nashville, TN (USA). Dept. of Physics and Astronomy	
	11:49075	LA-UR—86-2369
	Princeton Univ., NJ (USA). Dept. of Chemical Engineering	
	11:49100	SAND—85-2707C
	Los Alamos National Lab., NM (USA)	
	11:49171	LA-UR—86-2540
	11:49175	Journal of Physics G: Nuclear Physics 12 NO. 3. L75-L81 (Mar 1986).
	11:49188	LA-UR—86-2386
	11:49194	Journal of Mathematical Physics (New York) 27 NO. 9. 2379-2393 (Sep 1986).
	11:49234	LA-UR—86-2139
	Los Alamos National Lab., NM (USA). Center for Nonlinear Studies	
	11:49441	LA-UR—86-2528
	Los Alamos National Lab., NM (USA)	
	11:49492	LA-UR—86-2381
	11:49493	LA-UR—86-2419
	11:49556	LA-UR—86-2299
	11:49557	LA-UR—86-2636
	11:49597	LA-UR—86-1481
	11:49637	(6 May 1985).
W-7405-ENG-48	**Lawrence Livermore National Lab., CA (USA)**	
	11:47287	UCRL—93645
	11:47375	(16 Apr 1985).
	11:47740	UCID—20834
	11:47905	UCID—20832
	11:48004	UCID—20795
	11:48028	UCID—20816
	11:48038	57 NO. 2. 214-217 (14 Jul 1986).
	11:48048	(20 May 1985).
	11:48207	Chemical Physics (Amsterdam) 75 121-132 (1983).
	11:48216	UCRL—94731
	11:48221	Combustion and Flame 51 263-277 (1983).
	Lawrence Livermore National Lab., CA (USA). Signal and Image Processing Research Group	
	11:48223	UCID—20808
	Lawrence Livermore National Lab., CA (USA)	
	11:48224	UCRL—94092
	11:48244	UCID—20842
	11:48245	UCRL—94446
	11:48247	(12 Sep 1985).
	11:48249	(5 Aug 1985).
	11:48273	555-556 (Nov 1984).
	11:48274	557-559 (Nov 1984).
	11:48275	9 NO. 3. 73-75 (Mar 1984).
	11:48284	UCID—20680
	Lawrence Livermore National Lab., CA (USA). Mechanical Engineering Dept.	
	11:48285	UCID—20824
	Houston Univ., TX (USA). Dept. of Mechanical Engineering	
	11:48293	UCRL—15715
	Lawrence Livermore National Lab., CA (USA)	
	11:48294	UCRL—93185
	11:48295	UCRL—94282
	11:48311	UCID—20788
	11:48312	UCRL—94855
	11:48313	UCRL—94856
	11:48324	UCRL—93040
	11:48365	UCRL—93752
	11:48366	UCRL—93757
	11:48368	UCRL—94759
	ORD, Inc., Everett, MA (USA)	
	11:48636	UCRL—15830
	Lawrence Livermore National Lab., CA (USA)	
	11:48642	(30 Sep 1985).
	11:48652	UCRL—94857
	11:48656	UCID—20804
	11:48912	UCRL—94281
	11:48918	Environmental Mutagenesis 8 NO. 3. 345-355 (1986).
	11:48920	Environmental Mutagenesis 8 NO. 3. 467-484 (1986).
	11:48923	Environmental Health Perspectives 62 73-79 (Oct 1985).
	11:48948	UCRL—53630
	11:49101	UCRL—94277
	11:49102	UCRL—94800
	11:49235	UCRL—94764
	11:49267	UCRL—94405
	11:49344	320 NO. 6059. 246-248 (20 Mar 1986).
	11:49365	34 NO. 2. 594-600 (Aug 1986).
	11:49456	UCID—20846
	11:49506	Journal of Computational Physics 66 NO. 1. 197-217 (Sep 1986).
	11:49550	DOE/NBM—6012187
	11:49569	UCID—20234

Contract No.	Abstract No.	Report No.
	11:49576	UCRL—52000-86-4/5
	11:49577	UCRL—53750
	11:49578	UCRL—94084
	11:49579	UCRL—94115
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	11:49580	UCRL—94693
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	11:49581	UCRL—94815
	Lawrence Livermore National Lab., CA (USA). Methods Development Group	
	11:49624	UCID—19054
	Lawrence Livermore National Lab., CA (USA)	
	11:49625	UCRL—53751
	11:49626	UCRL—92925-Rev.1
	11:49627	UCRL—94377
W-7405-ENG-82	**Iowa State Univ. of Science and Technology, Ames (USA)**	
	11:47178	(1985).
	11:47189	(1985).
	Ames Lab., IA (USA)	
	11:47199	IS-M—574
	11:47961	57 NO. 2. 238-241 (14 Jul 1986).
	11:47969	(28 Oct 1985).
	11:47990	Journal of the American Ceramic Society 69 NO. 5. 423-429 (May 1986).
	Iowa State Univ. of Science and Technology, Ames (USA)	
	11:48131	(1985).
	11:48162	(1985).
	11:48163	(1985).
	11:48164	(1985).
	11:48165	(1985).
	11:48172	Journal of the American Chemical Society 108 NO. 17. 5154-5158 (20 Aug 1986).

Contract No.	Abstract No.	Report No.
	11:48174	Journal of the American Chemical Society 108 NO. 17. 5353-5354 (20 Aug 1986).
	11:48187	Journal of the American Chemical Society 108 NO. 14. 4138-4144 (9 Jul 1986).
	11:48192	(1985).
	11:48204	(1985).
	11:48205	(1985).
	Ames Lab., IA (USA)	
	11:48320	(20 May 1985).
	11:48407	222 177-179 (1984).
	11:48640	Applied Spectroscopy 40 NO. 4. 461-463 (May 1986).
	11:48648	(5 Apr 1985).
W-31109-ENG-38	**Argonne National Lab., IL (USA)**	
	11:47202	CONF-860940—1
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	11:47751	CONF-8604116—5
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	11:47867	CONF-8606112—3
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CONF-800386-	(Annual meeting on nuclear technology, Berlin, F.R. Germany, 25-27 Mar 1980)			
Pt.1	*See* INIS-mf-10187	DE86752574	MN -80	11:47610
CONF-810326-	(Annual meeting on nuclear technology, Dusseldorf, F.R. Germany, 24-26 Mar 1981)			
	See INIS-mf-10197	DE86752596	MN -80	11:47629
	See INIS-mf-10186	DE86752576	MN -80	11:47705
CONF-8205205-	(Meeting on nuclear technology, Mannheim, F.R. Germany, 4-6 May 1982)			
	See INIS-mf-10188	DE86752575	MN -80	11:47633
CONF-8303222-	(Microdosimetry seminar, Bratislava, Czechoslovakia, 22 Mar 1983)			
	See INIS-mf-10144	DE86703161	MN -48	11:48834
CONF-8309388-	(Symposium on star clusters and associations and their relation to the evolution of the galaxy, Prague, Czechoslovakia, 27 Sep-1 Oct 1983)			
	See INIS-mf-10417	DE86703233	MN -34B	11:48970
CONF-8401117-	(ASHRAE semi-annual meeting, Philadelphia, PA, USA, 1 Jan 1984)			
1	*See* LBL-11386	E 1.99: DE86013010	MN -59B	11:47856
CONF-8403241-	(Study meeting on criteria for materials of nuclear fusion reactors, Nagoya, Japan, 1-2 Mar 1984)			
	See IPPJ-DT-115	DE86703134	MN -20	11:49554
CONF-8405356-	(Conference on risk quantitation and regulatory policy, Lloyd Harbor, NY, USA, 13-15 May 1984)			
	Cold Spring Harbor Lab., Box 100, Cold Spring Harbor, NY 11724	TI86001160	ND -11	11:48929
CONF-8405417-	(Workshop on data acquisition system for high energy physics, Ono, Ibaraki, Japan, 28-29 May 1984)			
Summs.	*See* KEK-84-13	DE86703177	MN -28	11:48389
CONF-840610-	(Windows in building design and maintenance conference, Gothenburg, Sweden, 13-15 Jun 1984)			
5	*See* LBL-17562	E 1.99: DE86013649	MN -59B	11:47857
CONF-8406336-	(Meeting on methods and criteria for the assessment and monitoring of air pollution effects on forests, Freiburg im Breisgau, F.R. Germany, 18-20 Jun 1984)			
	NTIS (US Sales Only), PC A16/MF A01; 1	DE86752563	MN -11	11:48904
CONF-840801-	(20. international symposium on combustion, Ann Arbor, MI, USA, 12-17 Aug 1984)			
	Pittsburgh, PA; Combustion Institute (1985).			11:48218
CONF-8409260-	(CERN accelerator school, Gif-sur-Yvette, France, 3-14 Sep 1984)			
2	*See* CEA-CONF-7944	DE86750866	MN -34B	11:48963
CONF-8409349-	(Final research co-ordination meeting on the study of radioactive materials in the Baltic Sea, Helsinki, Finland, 24-28 Sep 1984)			
	See IAEA-TECDOC-362	DE86703160	MN -11	11:48714
CONF-8409354-	(Seminar on long-term mechanical properties of steels under effect of corrosive medium, Visalaje, Czechoslovakia, 26-27 Sep 1984)			
	See INIS-mf-10145	DE86703157	MN -25	11:47941
CONF-8410428-	(International meeting on technical means of nuclear material control at WWER-440 reactors and ways for optimizing their use for purpose of IAEA safeguards, Tbilissi, USSR, 5-11 Oct 1984)			
2	*See* SAAS-336	DE86703215	MN -16	11:47347
3	*See* SAAS-337	DE86703216	MN -16	11:47348
CONF-8411262-	(14. international symposium on the interaction of fast neutrons with nuclei, Gaussig, German D.R., 19-23 Nov 1984)			
	See ZfK-562	DE86703145	MN -46	11:49432
CONF-850375-	(20. Recontre de Moriond, Les Arcs, France, 10-23 Mar 1985)			
23	*See* CEA-CONF-7939	DE86750870	MN -34D	11:49176
24	*See* CEA-CONF-7938	DE86750871	MN -34D	11:49170
CONF-8504175-	(European conference on computer algebra, Linz, Austria, 1-3 Apr 1985)			
1	*See* CEA-CONF-7941	DE86750869	MN -32	11:49608
CONF-8504198-	(9. course on nucleus-nucleus collisions from the Coulomb barrier up to the quark-gluon plasma, Erice, Italy, 10-22 Apr 1985)			
4	*See* CEA-CONF-7946	DE86750847	MN -34C	11:49348
CONF-8504258-	(Workshop on photon activation therapy, Upton, NY, USA, 18 Apr 1985)			
	See BNL-51997	E 1.99: DE86013672	STD -48	11:48800
CONF-850504-	(Particle accelerator conference, Vancouver, Canada, 13-16 May 1985)			
Pt.1	Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piocataway, NJ 08854-4150	TI86014309	ND -28	11:48329
CONF-850532-	(International conference on ion and plasma assisted techniques, Munich, F.R. Germany, 14-16 May 1985)			
1	*See* CEA-CONF-8003	DE86750850	MN -37	11:48438

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CONF-8505112-	(2. international symposium on the biology and toxicology of metals using nuclear analytical methods, Upton, NY, USA, 20-22 May 1985)				
6	*See* BNL-38283	E 1.99:	DE86013909	MN -48	11:48799
CONF-8505189-	(Atomic theory workshop on relativistic and QED effects in heavy atoms, Gaithersburg, MD, USA, 23-24 May 1985)				
5	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86008986	MN -34A	11:49384
CONF-8505294-	(3. annual seminar of the technical career program for professional engineers, Portland, OR, USA, 10 May 1985)				
	See DOE/BP-555	E 1.99:	DE86012884	MN -13	11:47485
CONF-8505295-	(Fitness for purpose in welded construction meeting, Philadelphia, PA, USA, 13-16 May 1985)				
1	*See* EGG-M-06485	E 1.99:	DE86013464	MN -38	11:48291
CONF-8505303-	(17. international Liege colloquim on ocean hydrodynamics, Liege, Belgium, 13-17 May 1985)				
1	*See* BNL-38342		DE86014135	MN -11	11:48954
CONF-850634-	(International school for intermediate energy nuclear physics, Veronna, Italy, 20-30 Jun 1985)				
5	*See* CEA-CONF-8021		DE86750848	MN -34C	11:49339
CONF-850680-	(Advanced international training course on implementation of state systems of accounting for and control of nuclear material, Santa Fe, NM, USA, 2-22 Jun 1985)				
	See LA-10672-C	E 1.99:	DE86013067	STD -15	11:47345
CONF-8506153-	(SP-100 systems selection committee review on fuels and materials conference, Los Alamos, NM, USA, 20 Jun 1985)				
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE85014656	MN -80	11:47598
CONF-8506162-	(Symposium on medium energy nucleon and antinucleon scattering, Bad Honnef, F.R. Germany, 18-21 Jun 1985)				
3	*See* CEA-CONF-8014		DE86750849	MN -34C	11:49118
CONF-8506271-	(2. Hungaro-Italian symposium on spectrochemistry: natural materials and spectral analysis, Budapest, Hungary, 10-14 Jun 1985)				
1	*See* ENEA-RT-TIB-86/5		DE86901526	MN -4	11:48058
CONF-8506281-	(Colloquium on solvent extraction and ions exchange, Toulouse, France, 5-7 Jun 1985)				
1	*See* CEA-CONF-8006		DE86750853	MN -86	11:47275
CONF-8506289-	(2. national congress on medical biology and genetics with international participation, Sofia, Bulgaria, 8-9 Jun 1985)				
Absts.	*See* INIS-mf-10172		DE86780481	MN -48	11:48843
CONF-8506290-	(International symposium on drug therapy and alternative therapy methods, Sopron, Hungary, 21-22 Jun 1985)				
Absts.	*See* OEFZS-A-0686			ND -48	11:48807
CONF-8506303-	(7. annual international meeting of the Alternative Natural Philosophy Association, Cambridge, UK, 28 Jun-1 Jul 1985)				
1	*See* SLAC-PUB-4008	E 1.99:	DE86014649	MN -34D	11:49455
CONF-8506305-	(International conference on surface and colloid chemistry, Potsdam, NY, USA, 24-28 Jun 1985)				
1	*See* N-86-25284				11:48009
CONF-850765-	(26. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 21-24 Jul 1985)				
	Nucl. Mater. Manage., 14: No. 3, 272-277(1985)				11:48251
	Nucl. Mater. Manage., 14: No. 3, 357-362(1985)				11:48252
	Nucl. Mater. Manage., 14: No. 3, 461-465(1985)				11:48298
	Nucl. Mater. Manage., 14: No. 3, 454-460(1985)				11:49638
	Nucl. Mater. Manage., 14: No. 3, 251-256(1985)				11:49639
CONF-850807-	(6. international symposium on polarization phenomena in nuclear physics, Osaka, Japan, 26-30 Aug 1985)				
13	*See* CEA-CONF-7913		DE86750876	MN -34C	11:49383
CONF-850809-	(8. international conference on structural mechanics in reactor technology, Brussels, Belgium, 19-23 Aug 1985)				
EXC.	*See* NUREG/CP-0065		TI85901725	MN -80	11:47627
CONF-8508179-	(10. AINSE radiation biology conference, Lucas Heights, Australia, 22-23 Aug 1985)				
	See INIS-mf-10402		DE86780480	MN -48	11:48857
CONF-8508188-	(Larval fish and shellfish transport through coastal inlets, Ocean Springs, MS, USA, 19-20 Aug 1985)				
1	*See* DOE/ER/60376-12b	E 1.99:	DE86013057	MN -11	11:48931
CONF-8508192-	(1. international conference on deep freezing of boar semen, Uppsala, Sweden, 25-27 Aug 1985)				
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014216	MN -48	11:48898

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CONF-850932-	(Seminar on applied research and service activities for research reactor operations, Copenhagen, Denmark, 9-13 Sep 1985)				
3	*See* RT/TIB-85/27		DE86901559	MN -2	11:48084
CONF-8509126-	(Hot humid climate conference, College Station, TX, USA, 24-26 Sep 1985)				
6	*See* PNL-SA-13260	E 1.99:	DE86011627	MN -95d	11:47858
CONF-8509282-	(1. technical conference of the South Saskatchewan Section of the Petroleum Society of CIM, Regina, Saskatchewan, Canada, 15-17 Sep 1985)				
	Regina, Saskatchewan; The Petroleum Society of CIM (1985).				11:47219
CONF-8509315-	(Seminar on an integrated weather radar network for Western Europe, Erice, Italy, 30 Sep-3 Oct 1985)				
	See EUR-10353-EN-FR			ND -11	11:48657
CONF-8509317-	(SMM topical workshop on rapid fluctuations in solar flares, Lanham, MD, USA, 30 Sep-4 Oct 1985)				
1	*See* N-86-25316				11:49006
CONF-8510101-	(Boulder damage symposium, Boulder, CO, USA, 15-17 Oct 1985)				
8	*See* LA-UR-86-2542	E 1.99:	DE86013830	MN -38	11:48258
CONF-8510153-	(11. MPA seminar, Stuttgart, F.R. Germany, 10-11 Oct 1985)				
5-Trans.	*See* BLL-RISLEY-TR-280-(9091.9F)				11:47520
CONF-8510160-	(ASM metals congress/TMS-AIME fall meeting, Toronto, Ontario, Canada, 13-18 Oct 1985)				
19	*See* EGG-J-01586	E 1.99:	DE86013457	MN -38	11:48281
CONF-8510205-	(3. international conference on low-level counting, Bratislava, Czechoslovakia, 21-25 Oct 1985)				
Absts.	*See* INIS-mf-10174		DE86703198	MN -37	11:48559
CONF-8510266-	(International pellet fueling workshop, La Jolla, CA, USA, 30 Oct-3 Nov 1985)				
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014230	MN -20	11:49542
2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014229	MN -20	11:49543
3	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014222	MN -20d	11:49544
4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014231	MN -20	11:49545
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014027	MN -20d	11:49475
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014236	MN -20	11:49476
CONF-8510282-	(University of Chicago Review Committee meeting, Argonne, IL, USA, 8-9 Oct 1985)				
1	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86001406	MN -2	11:47511
CONF-8510319-	(VMEbus in physics conference, Geneva, Switzerland, 7-8 Oct 1985)				
	See CERN-86-01		DE86703218	MN -32	11:49609
CONF-8511123-	(2. international technical symposium on optical and electro-optical applied science and engineering, Cannes, France, 25 Nov-6 Dec 1985)				
5	*See* LBL-20466	E 1.99:	DE86013485	MN -37	11:48632
CONF-8511131-	(5. international workshop on electron cyclotron emission and electron cyclotron heating, San Diego, CA, USA, 9-12 Nov 1985)				
6	*See* GA-A-18227	E 1.99:	DE86014034	MN -20	11:49486
CONF-8511150-	(Workshop on triggering, data acquisition and computing for high energy/high luminosity hadron-hadron colliders, Batavia, IL, USA, 11-14 Nov 1985)				
10	*See* ANL-HEP-CP-86-76	E 1.99:	DE86014606	MN -28	11:49114
11	*See* ANL-HEP-CP-86-74	E 1.99:	DE86014605	MN -28	11:48376
CONF-8511208-	(IKE colloquium: reduction of NO/sub x/-emission of gas-fired furnaces, Stuttgart, F.R. Germany, 29 Nov 1985)				
1	NTIS (US Sales Only), PC A02/MF A01		DE86752565	MN -11	11:48663
CONF-8511220-	(Seminar on nuclear data, Tokai, Japan, 12-14 Nov 1985)				
	See NEANDC(J)-120/U		TI86901587	ND -34C	11:49223
CONF-851202-	(DOE-ORNL-ASHRAE-BTECC conference on thermal performance of the exterior envelopes of buildings-III, Clearwater Beach, FL, USA, 2-5 Dec 1985)				
15	*See* SERI/TP-254-2999	E 1.99:	DE86010725	MN -62	11:47860
CONF-851215-	(International load management conference and exposition, Chicago, IL, USA, 9-11 Dec 1985)				
	See EPRI-EM-4643		TI86920370	ND -97b	11:47480
CONF-851271-	(American Society of Agricultural Engineers winter meeting: the world food situation - now and the year 2000, Chicago, IL, USA, 17-20 Dec 1985)				
	St. Joseph, MI; American Society of Agricultural Engineers (1985).				11:47424
CONF-851281-	(DNA metabolism influencing factors, Vienna, Austria, 5-6 Dec 1985)				
Absts.	*See* OEFZS-A-0756			ND -23	11:48896
CONF-851286-	(Symposium on magnetic resonanace of excited state molecules, Kyoto, Japan, 21-22 Dec 1985)				
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013389	MN -4	11:48133

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CONF-860102-	(3. symposium on space nuclear power systems, Albuquerque, NM, USA, 13-16 Jan 1986)				
12	*See* PNL-SA-13751	E 1.99:	DE86013601	MN -33	11:47600
CONF-860148-	(2. United States/Mexico cooperative symposium on atomic and molecular physics, Cocoyoc, Mexico, 1 Jan 1986)				
6	*See* KU-HCOE-FL2-R-85-27		DE86752094	MN -34A	11:49074
CONF-860150-	(Winter condensed matter physics conference: frontiers in condensed matter X-ray physics, Aspen, CO, USA, 12-18 Jan 1986)				
6	*See* ANL-HEP-CP-86-32	E 1.99:	DE86014604	MN -28	11:48435
CONF-860152-	(10. annual conference on composites and advanced ceramic materials, Cocoa Beach, FL, USA, 19-24 Jan 1986)				
4	*See* N-86-24836				11:47982
5	*See* N-86-24839				11:47983
6	*See* N-86-25476				11:47897
CONF-860162-	(Workshop on radiation damage to wire chambers, Berkeley, CA, USA, 16-17 Jan 1986)				
6	*See* SLAC-PUB-4017	E 1.99:	DE86014473	MN -28	11:48616
CONF-860179-	(Workshop on astronomical observations from a lunar base, Houston, TX, USA, 10 Jan 1986)				
1	*See* LA-UR-86-1481	E 1.99:	DE86010207	MN -13	11:49597
CONF-860180-	(Workshop on the tectonic evolution of greenstone belts, Houston, TX, USA, 16-18 Jan 1986)				
	See N-86-23089				11:48940
CONF-860204-	(Thermal reactor safety meeting, San Diego, CA, USA, 2-6 Feb 1986)				
39	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86008993	MN -80	11:47665
CONF-860270-	(4. winter workshop on nuclear dynamics, Copper Mountain, CO, USA, 24-28 Feb 1986)				
9	*See* LBL-21650	E 1.99:	DE86013200	MN -34C	11:49261
10	*See* LBL-21532	E 1.99:	DE86012800	MN -34C	11:49323
CONF-860272-	(Wire chamber conference, Vienna, Austria, 25-28 Feb 1986)				
Absts.	*See* INIS-mf-10173		DE86703196	MN -37	11:48444
CONF-860297-	(5. international cadmium conference, San Francisco, CA, USA, 1 Feb 1986)				
1	*See* BNL-38374	E 1.99:	DE86014174	MN -48	11:48902
CONF-860315-	(International symposium on the optimization of radiation protection, Vienna, Austria, 10-14 Mar 1986)				
1	*See* PNL-SA-13454	E 1.99:	DE86013340	MN -41	11:48897
CONF-860340-	(115. American Institute of Mining, Metallurgical and Petroleum Engineers annual meeting, New Orleans, LA, USA, 2-6 Mar 1986)				
7	*See* N-86-25453				11:47948
CONF-860366-	(SPIE technical symposium on applications of artificial intelligence, Orlando, FL, USA, 31 Mar 1986)				
10	*See* BNL-38387	E 1.99:	DE86014176	MN -28	11:48379
11	*See* BNL-38386	E 1.99:	DE86014177	MN -37	11:49450
CONF-8603114-	(Workshop on relativistic channeling acquafredda di Maratea, Maratea, Italy, 31 Mar-4 Apr 1986)				
2	*See* FNAL/C-86/52-E	E 1.99:	DE86014371	MN -28	11:48354
CONF-8603139-	(Southeastcon '86: IEEE region 3 conference and exhibit, Richmond, VA, USA, 23-26 Mar 1986)				
1	*See* Y/DW-642		DE86012720	MN -38	11:48296
CONF-860405-	(10. annual symposium on energy from biomass and wastes, Washington, DC, USA, 7-10 Apr 1986)				
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014580	MN -61E	11:47372
CONF-860417-	(3. international symposium/workshop on irradiated fuel storage, Seattle, WA, USA, 8-10 Apr 1986)				
Vol.1	NTIS, PC A19/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014260	MN -85	11:47282
Vol.2	NTIS, PC A23/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014261	MN -85	11:47283
CONF-860421-	(2. international conference on fusion reactor materials (ICFRM-2), Chicago, IL, USA, 13-17 Apr 1986)				
59	*See* HEDL-SA-3423-FP	E 1.99:	DE86014759	MN -20c	11:47935
CONF-860425-	(191. American Chemical Society national meeting, New York, NY, USA, 13-18 Apr 1986)				
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 169(Mar 1986)				11:47368
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 182(Mar 1986)				11:47369
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 198-207(Mar 1986)				11:47370
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 317(Mar 1986)				11:47371
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 295-306(Mar 1986)				11:48089
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 177-181(Mar 1986)				11:48156
	Am. Chem. Soc., Div. Pet. Chem., Prepr., 31: No. 1, 238-244(Mar 1986)				11:48157

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CONF-860441-	(5. international conference on ultra-relativistic nucleus-nucleus collisions (Quark Matter '86), Pacific Grove, CA, USA, 13-17 Apr 1986)			
4	*See* BNL-38229	E 1.99: DE86014137	MN -34D	11:48437
6	*See* BNL-38298	E 1.99: DE86014185	MN -34D	11:49218
CONF-860447-	(American Institute of Chemical Engineers spring national meeting, New Orleans, LA, USA, 6-10 Apr 1986)			
	New York, NY; American Institute of Chemical Engineers (1986).			11:47176
	New York, NY; American Institute of Chemical Engineers (1986).			11:47187
	New York, NY; American Institute of Chemical Engineers (1986).			11:47188
	New York, NY; American Institute of Chemical Engineers (1986).			11:47200
	New York, NY; American Institute of Chemical Engineers (1986).			11:47230
	New York, NY; American Institute of Chemical Engineers (1986).			11:47374
CONF-8604103-	(Conference on frontiers of electron microscopy in materials science, Argonne, IL, USA, 21-23 Apr 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014579	MN -38	11:48440
2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014572	MN -25	11:47923
3	NTIS, PC A02/MF A01; 1	DE86014571	MN -25	11:47975
CONF-8604116-	(International workshop on high temperature molten salt batteries, Argonne, IL, USA, 16-18 Apr 1986)			
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014574	MN -94cb	11:47751
CONF-8604165-	(International conference on heavy ion physics, Rochester, NY, USA, 21-22 Apr 1986)			
8	*See* LBL-21580	E 1.99: DE86013199	MN -34C	11:49353
9	*See* LBL-21462	E 1.99: DE86013203	MN -34C	11:49412
CONF-8604194-	(International symposium on three-body force in the three-nucleon system, Washington, DC, USA, 24-26 Apr 1986)			
2	*See* LA-UR-86-2139	E 1.99: DE86012399	MN -34C	11:49234
5	*See* SLAC-PUB-3973	E 1.99: DE86012961	MN -34D	11:49413
CONF-8604202-	(7. workshop on grand unification, Toyama City, Japan, 16-18 Apr 1986)			
2	*See* ANL-HEP-CP-86-47	E 1.99: DE86014578	MN -34D	11:49113
CONF-8604222-	(70. annual meeting of the Federation of American Society for Experimental Biology, St. Louis, MO, USA, 13-18 Apr 1986)			
	Fed. Proc. Fed. Amer. Soc. Exp. Biol., 45: No. 3, 392(1 Mar 1986)			11:47212
	Fed. Proc. Fed. Amer. Soc. Exp. Biol., 45: No. 3, 392(1 Mar 1986)			11:48810
	Fed. Proc. Fed. Amer. Soc. Exp. Biol., 45: No. 3, 312(1 Mar 1986)			11:48822
	Fed. Proc. Fed. Amer. Soc. Exp. Biol., 45: No. 3, 517(1 Mar 1986)			11:48915
CONF-8604229-	(2. international symposium on biological reference materials, Neuherberg, F.R. Germany, 24-25 Apr 1986)			
1	*See* BNL-38365	E 1.99: DE86014173	MN -48	11:48056
CONF-860501-	(Conference on the science and technology of fast reactor safety, Channel Islands, UK, 12-16 May 1986)			
14	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014493	MN -79p	11:47510
15	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014494	MN -79p	11:47666
CONF-860510-	(Symposium on heavy ion fusion, Washington, DC, USA, 27-29 May 1986)			
11	*See* LA-UR-86-2636	E 1.99: DE86013821	MN -21	11:49557
12	*See* UCRL-94348	E 1.99: DE86014428	MN -21	11:48367
CONF-860522-	(7. international conference on plasma surface interactions in controlled fusion devices, Princeton, NJ, USA, 5-9 May 1986)			
19	*See* GA-A-18455	E 1.99: DE86014030	MN -21	11:49552
20	*See* GA-A-18454	E 1.99: DE86014028	MN -21	11:49487
CONF-860535-	(3. annual heat engines contractors' meeting, Morgantown, WV, USA, 6-8 May 1986)			
2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014595	MN -90h	11:47201
CONF-860551-	(Technical meeting and workshop on fusion reactor design and technology, Yalta, USSR, 26 May-6 Jun 1986)			
8	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014593	MN -20	11:49536
CONF-860575-	(2. conference on particle and nuclear physics, Lake Louise, Canada, 26-31 May 1986)			
14	*See* UCRL-94764	E 1.99: DE86012806	MN -34C	11:49235
16	*See* LBL-21673	E 1.99: DE86013009	MN -28	11:48343
17	*See* LBL-21536	E 1.99: DE86013190	MN -28	11:48342
18	*See* DOE/ER/02853-29	E 1.99: DE86013356	MN -34C	11:49387
20	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013343	MN -28	11:48409
21	*See* DOE/ER/40048-163-L6	E 1.99: DE86013146	MN -34D	11:49123

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22	*See* LBL-21716	E 1.99:	DE86013472	MN -34D	11:49129
23	*See* BNL-38285	E 1.99:	DE86013913	MN -34D	11:49115
26	*See* LA-UR-86-2540	E 1.99:	DE86013831	MN -34C	11:49171
28	*See* BNL-38297	E 1.99:	DE86014123	MN -34D	11:49217
29	*See* BNL-38304	E 1.99:	DE86014131	MN -34D	11:49116
30	*See* BNL-38336	E 1.99:	DE86014182	MN -34D	11:49232
31	*See* DOE/ER/40048-26-N6	E 1.99:	DE86014282	MN -34D	11:49219
32	*See* DOE/ER/40048-29-N6	E 1.99:	DE86014284	MN -34D	11:49183
33	*See* SLAC-PUB-4029	E 1.99:	DE86014470	MN -34D	11:49161
34	*See* ANL-HEP-CP-86-39	E 1.99:	DE86014587	MN -34D	11:48962
35	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014584	MN -28	11:48353
36	*See* ANL-HEP-CP-86-40	E 1.99:	DE86014585	MN -34C	11:48436
CONF-8605131-	(7. international ECR source workshop, Julich, F.R. Germany, 22-23 May 1986)				
2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014599	MN -28	11:48381
CONF-8605139-	(Minimars review meeting, Toronto, Canada, 20 May 1986)				
3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86011758	MN -20	11:49546
CONF-8605146-	(15. Yamada conference on physics and chemistry of quasi one-dimensional conductors, Lake Kawaguchi, Japan, 26-30 May 1986)				
8	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014588	MN -34	11:48017
CONF-8605150-	(Beijing symposium on physics at tandem, Beijing, China, 26-30 May 1986)				
2	*See* DOE/ER/40048-162		DE86013147	MN -34C	11:49349
CONF-8605158-	(Department of Energy nuclear data committee meeting, Germantown, MD, USA, 1-2 May 1986)				
1	*See* BNL-NCS-37975	E 1.99:	DE86012708	MN -34C	11:49338
CONF-8605162-	(International symposium on production and decay of heavy flavours, Heidelberg, F.R. Germany, 19-23 May 1986)				
1	*See* SLAC-PUB-4001	E 1.99:	DE86012959	MN -34D	11:49160
2	*See* SLAC-PUB-4026	E 1.99:	DE86014475	MN -34D	11:49132
CONF-8605163-	(Workshop on physics simulation at high energies, Madison, WI, USA, 5-16 May 1986)				
4	*See* LBL-21695	E 1.99:	DE86013487	MN -34D	11:49154
CONF-8605164-	(2. topical seminar on perspectives for experimental apparatus at future high energy machines, San Miniato, Italy, 5-9 May 1986)				
1	*See* SLAC-PUB-4020	E 1.99:	DE86013434	MN -28	11:48617
CONF-8605166-	(International conference on fast neutron physics, Dubrovnik, Yugoslavia, 26-31 May 1986)				
1	*See* UCRL-94405	E 1.99:	DE86013025	MN -34C	11:49267
CONF-8605167-	(Workshop on forest crop nutrition: production, prices and pathways, Kingston, Ontario, Canada, 20-23 May 1986)				
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013410	MN -11	11:48704
CONF-860601-	(4. international conference on emerging nuclear energy systems, Madrid, Spain, 30 Jun-4 Jul 1986)				
7	*See* BNL-38384	E 1.99:	DE86014168	MN -21	11:49532
8	*See* BNL-38379	E 1.99:	DE86014169	MN -80	11:47505
CONF-860602-	(17. rare earth research conference, Hamilton, Ontario, Canada, 8-12 Jun 1986)				
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014568	MN -34	11:48013
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014536	MN -25	11:47915
CONF-860604-	(International symposium on the packaging and transport of radioactive materials (PATRAM '86), Davos, Switzerland, 16-20 Jun 1986)				
28	*See* EGG-M-T-0286	E 1.99:	DE86013459	MN -71	11:47284
CONF-860605-	(13. international symposium on the effects of radiation on materials, Seattle, WA, USA, 23-25 Jun 1986)				
18	*See* EGG-M-22985	E 1.99:	DE86013469	MN -2	11:47647
19	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014492	MN -25	11:47916
20	NTIS, PC A02/MF A01 - GPO		TI86014487	MN -80	11:47917
21	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014531	MN -25	11:47918
22	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014529	MN -25	11:47919
23	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014530	MN -25	11:47920
24	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014499	MN -25	11:47921
CONF-860608-	(World congress on high tech ceramics: electronic, engineering, nuclear, biomedical research and applications in focus, Milan, Italy, 23-27 Jun 1986)				
4	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014489	MN -25	11:48014
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014490	MN -25	11:48015
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014491	MN -25	11:48016
7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014558	MN -90c	11:47146
CONF-860610-	(American Nuclear Society annual meeting, Reno, NV, USA, 15-20 Jun 1986)				
2	NTIS, PC A02/MF A01 - GPO		TI86005151	MN -80	11:47667
16	*See* BNL-NUREG-37691		TI86007123	MN -80	11:47656
24	*See* SAND-86-0335C	E 1.99:	DE86007827	MN -80	11:47622

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CONF-860620-	(Society of Photo-Optical Instrumentation Engineers international symposium: topics in optical and optoelectronic applied sciences and engineering, Quebec City, Canada, 2-6 Jun 1986)			
10	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014559	MN -25	11:48134
CONF-860629-	(Linear accelerator conference, Stanford, CA, USA, 2-6 Jun 1986)			
21	*See* SLAC-PUB-3980	E 1.99: DE86012876	MN -28	11:48615
25	*See* SLAC-PUB-3981	E 1.99: DE86013441	MN -28	11:48346
28	*See* SLAC-PUB-3977	E 1.99: DE86013508	MN -28	11:48363
30	*See* SLAC-PUB-3965	E 1.99: DE86013438	MN -28	11:48362
31	*See* SLAC-PUB-3936	E 1.99: DE86013435	MN -28	11:48345
34	*See* SLAC-PUB-3945	E 1.99: DE86013507	MN -28	11:48403
35	*See* SLAC-PUB-3979	E 1.99: DE86014087	MN -28	11:48364
37	*See* SLAC-PUB-3935	E 1.99: DE86014469	MN -28	11:48361
38	*See* SLAC-PUB-3985	E 1.99: DE86014648	MN -34D	11:48347
39	*See* SLAC-PUB-3940	E 1.99: DE86014650	MN -28	11:48402
CONF-860652-	(7. topical meeting on the technology of fusion energy, Reno, NV, USA, 15-19 Jun 1986)			
11	*See* EGG-M-01286	E 1.99: DE86013489	MN -20	11:49551
12	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013258	MN -20	11:49537
15	*See* UCRL-94115	E 1.99: DE86013899	MN -20d	11:49579
16	*See* UCRL-94084	E 1.99: DE86013898	MN -20d	11:49578
18	*See* UCRL-94693	E 1.99: DE86013901	MN -20d	11:49580
19	*See* LA-UR-86-2299	E 1.99: DE86013858	MN -20f	11:49556
20	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014620	MN -20	11:49538
21	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014527	MN -20d	11:49539
22	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014554	MN -20b	11:49540
23	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014553	MN -20d	11:49541
CONF-860654-	(27. annual meeting of the Institute of Nuclear Materials Management, New Orleans, LA, USA, 22-25 Jun 1986)			
39	*See* GAT-NM-137	E 1.99: DE86013557	MN -16	11:47344
40	*See* BNL-38314	E 1.99: DE86014130	MN -15	11:47343
CONF-860655-	(American Solar Energy Society annual meeting and 11. national passive solar conference, Boulder, CO, USA, 8-14 Jun 1986)			
14	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014484	MN -59A	11:47427
15	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014488	MN -62	11:47428
CONF-860663-	(24. symposium of engineering aspects of magnetohydrodynamics, Butte, MT, USA, 24-27 Jun 1986)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014532	MN -90g	11:47824
3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014549	MN -90g	11:47825
CONF-860665-	(6. international conference on high power particle beams, Kobe, Japan, 9-12 Jun 1986)			
12	*See* UCRL-93752	E 1.99: DE86013218	MN -28	11:48365
14	*See* UCRL-93757	E 1.99: DE86013222	MN -28	11:48366
CONF-860688-	(32. NASA/US Army international power sources symposium, Cherry Hill, NJ, USA, 8-12 Jun 1986)			
5	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014498	MN -94c	11:47750
CONF-8606112-	(IASTED modelling and simulation conference, Vancouver, Canada, 4-6 Jun 1986)			
3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014495	MN -96	11:47867
CONF-8606127-	(7. international conference on modern trends in activation analysis, Copenhagen, Denmark, 23-27 Jun 1986)			
2	*See* PNL-SA-13923	E 1.99: DE86013599	MN -48	11:48911
CONF-8606128-	(Production and transport of secondary beam at a kaon factory workshop, Vancouver, B.C., Canada, 1-4 Jun 1986)			
2	*See* BNL-38307	E 1.99: DE86014134	MN -28	11:48377
3	*See* BNL-38310	E 1.99: DE86014132	MN -28	11:48378
CONF-8606133-	(International conference on science and technology of synthetic metals, Kyoto, Japan, 1-6 Jun 1986)			
7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014485	MN -34	11:48018
CONF-8606139-	(Health Physics Society meeting, Pittsburgh, PA, USA, 30 Jun 1986)			
4	*See* SLAC-PUB-3968	E 1.99: DE86012045	MN -28	11:48614
CONF-8606147-	(9. North American forest biology workshop, Stillwater, OK, USA, 15-18 Jun 1986)			
2	*See* UCRL-94281	E 1.99: DE86014435	MN -61A	11:48912
CONF-8606152-	(17. international Rochester conference, Rochester, NY, USA, 2-6 Jun 1986)			
3	*See* BNL-38373	E 1.99: DE86014129	MN -48	11:48901
CONF-8606153-	(DARPA conference, Albuquerque, NM, USA, 23-26 Jun 1986)			
2	*See* SAND-86-1544C	E 1.99: DE86012945	MN -28	11:48634
3	*See* SAND-86-1539C	E 1.99: DE86012944	MN -28	11:48358
5	*See* UCRL-94759	E 1.99: DE86013019	MN -28	11:48368
6	*See* SAND-86-1654C	E 1.99: DE86014150	MN -28	11:48359
CONF-8606157-	(NATO advanced study conference, Les Houche, France, 16-26 Jun 1986)			
2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014232	MN -34A	11:49067

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CONF-8606161-	(Conference on health and environmental effects of complex chemical mixtures, Delavan, WI, USA, 16-18 Jun 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014205	MN -48	11:48905
CONF-8606165-				
1	*See* LA-UR-86-2181	E 1.99: DE86012441	MN -4	11:48170
CONF-8606166-	(Meeting of the Fellows of the Royal Society, London, UK, 27 Jun 1986)			
1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86011974	MN -34A	11:49068
CONF-8606171-	(IAEA meeting on the coordination of the international nuclear structure and decay data evaluation network, Grenoble, France, 2-5 Jun 1986)			
1	*See* EGG-M-15186	E 1.99: DE86013451	MN -34C	11:49300
CONF-8606173-	(1. symposium on computational chemistry on cray supercomputers, Minneapolis, MN, USA, 11-13 Jun 1986)			
1	*See* SAND-86-1751C	E 1.99: DE86013573	MN -34A	11:49080
CONF-8606175-	(Workshop on the use of supercomputers in stellar dynamics, Princeton, NJ, USA, 2-4 Jun 1986)			
1	*See* LA-UR-86-2350	E 1.99: DE86013854	MN -34B	11:49004
CONF-8606179-	(USSR/US exchange II: 4. topical meeting on magnetic configurations, plasma equilibrium and stability of stellarators, Oak Ridge, TN, USA, 23 Jun-3 Jul 1986)			
Vol.2	NTIS, PC A12/MF A01; 3	DE86014483	MN -20	11:49347
CONF-8606180-	(Workshop on thermally treated alloy 690 tubes for nuclear steam generators, Pittsburgh, PA, USA, 26-28 Jun 1986)			
	See EPRI-NP-4665-S-SR	T186920431	ND -90	11:47624
CONF-8606181-	(4. international conference on particle induced X-ray emission and its analytical applications, Tallahassee, FL, USA, 9-13 Jun 1986)			
2	*See* BNL-38357	E 1.99: DE86014127	MN -48	11:48900
4	*See* BNL-38355	E 1.99: DE86014172	MN -48	11:48899
CONF-8606182-	(5. international school of cosmic ray astrophysics, Erice, Italy, 1-9 Jun 1986)			
1	*See* LA-UR-86-2590	E 1.99: DE86013825	MN -34B	11:48608
CONF-8606183-	(NATO international advanced course on physics of strong fields, Maratea, Italy, 1-14 Jun 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014220	MN -34D	11:49385
2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014221	MN -34D	11:49386
3	*See* DOE/ER/40048-28-N6	E 1.99: DE86014283	MN -34D	11:49182
CONF-8606184-	(22. joint propulsion conference, Huntsville, AL, USA, 16-19 Jun 1986)			
1	*See* N-86-24961			11:48213
CONF-860701-	(23. international conference on high-energy physics, Berkeley, CA, USA, 16-23 Jul 1986)			
7	*See* BNL-38385	E 1.99: DE86014167	MN -34D	11:49117
8	*See* FNAL/C-86/102-E	E 1.99: DE86014372	MN -34D	11:49124
CONF-860702-	(5. international conference on surface modification of metals by ion beams, Kingston, Ontario, Canada, 7-11 Jul 1986)			
2	*See* SAND-86-0809C	E 1.99: DE86014146	MN -25	11:47951
CONF-860703-	(4. international conference on megagauss magnetic-field generation and related topics, Santa Fe, NM, USA, 14-17 Jul 1986)			
9	*See* UCRL-94446	E 1.99: DE86013021	MN -38	11:48245
12	*See* LA-UR-86-2507	E 1.99: DE86013833	MN -38	11:48233
13	*See* LA-UR-86-2352	E 1.99: DE86013853	MN -38	11:48230
14	*See* LA-UR-86-2381	E 1.99: DE86013846	MN -21	11:49492
15	*See* LA-UR-86-2388	E 1.99: DE86013842	MN -28	11:48394
16	*See* LA-UR-86-2371	E 1.99: DE86013851	MN -38	11:48231
18	*See* LA-UR-86-2378	E 1.99: DE86013848	MN -38	11:48232
19	*See* LA-UR-86-2379	E 1.99: DE86013847	MN -38	11:48305
20	*See* LA-UR-86-2412	E 1.99: DE86013839	MN -38	11:48307
21	*See* LA-UR-86-2419	E 1.99: DE86013837	MN -20f	11:49493
22	*See* LA-UR-86-2413	E 1.99: DE86013838	MN -38	11:48607
23	*See* LA-UR-86-2372	E 1.99: DE86013850	MN -38	11:48304
24	*See* LA-UR-86-2387	E 1.99: DE86013843	MN -38	11:48306
25	*See* UCRL-94857	E 1.99: DE86014439	MN -35	11:48652
26	*See* UCRL-94277	E 1.99: DE86014440	MN -32	11:49101
27	*See* UCRL-94856	E 1.99: DE86014448	MN -38	11:48313
29	*See* UCRL-94855	E 1.99: DE86014447	MN -38	11:48312
CONF-860709-	(Conference on research and applications of aquatic plants for water treatment and resource recovery, Orlando, FL, USA, 20-24 Jul 1986)			
1	*See* PNL-SA-13853	E 1.99: DE86014376	MN -61	11:47367
CONF-860710-	(13. annual plasma physics conference, Oxford, UK, 2-4 Jul 1986)			
1	*See* SAND-86-1706C	E 1.99: DE86014370	MN -21	11:49568
CONF-860741-	(International symposium on weak and electromagnetic interactions in nuclei, Heidelberg, F.R. Germany, 1-5 Jul 1986)			
8	*See* DOE/ER/02853-30	E 1.99: DE86013355	MN -34C	11:49388

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9	*See* PNL-SA-14160	E 1.99: DE86013592	MN -34D	11:49306
11	*See* LA-UR-86-2386	E 1.99: DE86013844	MN -34D	11:49188
CONF-860746-	(Anomalous rare earths and actinides, Grenoble, France, 7-11 Jul 1986)			
3	*See* BNL-38329	E 1.99: DE86014125	MN -25	11:47914
CONF-860752-	(33. international field emission symposium (IFES), Berlin, F.R. Germany, 6-12 Jul 1986)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86012631	MN -25	11:47922
CONF-860753-	(International conference on EXAFS and near edge structure, Saumur, France, 7-11 Jul 1986)			
2	*See* BNL-38486	E 1.99: DE86014178	MN -34A	11:49050
5	*See* BNL-38396	E 1.99: DE86014774	MN -34A	11:49049
CONF-860755-	(4. Rochester conference, Rochester, NY, USA, 11-14 Jul 1986)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013403	MN -32	11:48301
CONF-860756-	(NATO advanced study institutes program conference, Pitlochry, Scotland, 13-25 Jul 1986)			
1	*See* SAND-86-1722C	E 1.99: DE86013565	MN -28	11:48344
2	*See* SAND-86-1748C	E 1.99: DE86014112	MN -28	11:48360
CONF-860757-	(Western Division of the American Fisheries Society annual meeting, Portland, OR, USA, 21-23 Jul 1986)			
1	*See* PNL-SA-13422	E 1.99: DE86013595	MN -11	11:47381
CONF-860758-	(13. international biometric conference, Seattle, WA, USA, 28-31 Jul 1986)			
1	*See* PNL-SA-14035	E 1.99: DE86013593	MN -32	11:49619
CONF-860759-	(Ordinary differential equations conference (ODE), Albuquerque, NM, USA, 28 Jul-1 Aug 1986)			
1	*See* SAND-86-1499C	E 1.99: DE86014140	MN -32	11:49623
CONF-860760-	(17. annual meeting of the Fine Particle Society, San Francisco, CA, USA, 28 Jul-2 Aug 1986)			
1	*See* SAND-85-2707C	E 1.99: DE86014142	MN -34	11:49100
CONF-860810-	(Intersociety energy conversion engineering conference, San Diego, CA, USA, 25-29 Aug 1986)			
19	*See* BNL-38312	E 1.99: DE86014124	MN -80	11:47522
20	*See* DOE/NASA-1005-9	E 1.99: DE86010333	STD -38	11:48328
CONF-860820-	(19. DOE/NRC nuclear air cleaning conference, Seattle, WA, USA, 17-21 Aug 1986)			
2	*See* LA-UR-86-2396	E 1.99: DE86013841	MN -41	11:48297
4	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE86014233	MN -86	11:47305
CONF-860829-	(Annual joint meeting of the Electron Microscopy of America and the Microbeam Analysis Society, Albuquerque, NM, USA, 10-15 Aug 1986)			
33	*See* KAPL-4193	E 1.99: DE86009673	STD -32	11:48606
CONF-860847-	(2. annual oil shale contractors' meeting, Morgantown, WV, USA, 12-14 Aug 1986)			
4	*See* SAND-86-1858C	E 1.99: DE86014721	MN -91	11:47243
CONF-860856-	(Conference on review of progress in quantitative NDE, San Diego, CA, USA, 3-8 Aug 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014224	MN -38	11:48290
CONF-860870-	(13. international conference on high energy accelerators, Novosibirsk, USSR, 7-11 Aug 1986)			
1	*See* SLAC-PUB-4013	E 1.99: DE86014471	MN -28	11:48348
CONF-860880-	(30. SPIE technical symposium on optics and optoelectronic engineering, San Diego, CA, USA, 17-22 Aug 1986)			
17	*See* LA-UR-86-2369	E 1.99: DE86013852	MN -34	11:49075
18	*See* BNL-38364	E 1.99: DE86014171	MN -37	11:48629
19	*See* SERI/TP-255-2995	E 1.99: DE86010727	MN -62	11:47432
CONF-860884-	(International carnahan conference on security technology, Gothenburg, Sweden, 12-14 Aug 1986)			
2	*See* SAND-86-1695C	E 1.99: DE86014147	MN -15	11:47349
CONF-860888-	(12. international conference on very large databases, Kyoto, Japan, 25-28 Aug 1986)			
1	*See* LA-UR-86-1596	E 1.99: DE86011258	MN -11	11:48823
CONF-860889-	(Structured development forum, Seattle, WA, USA, 11-14 Aug 1986)			
1	*See* EGG-10282-1114	E 1.99: DE86014026	MN -32	11:49615
CONF-860890-	(4. international Kimberlite conference, Perth, Australia, 10-15 Aug 1986)			
1	*See* LA-UR-86-2581	E 1.99: DE86013827	MN -11	11:48947
CONF-860891-	(Denver X-ray conference, Denver, CO, USA, 4-8 Aug 1986)			
1	*See* LA-UR-86-2637	E 1.99: DE86013820	MN -34	11:48631
CONF-860892-	(18. international conference on physics of semiconductors, Stockholm, Sweden, 11-15 Aug 1986)			
1	*See* LA-UR-86-2528	E 1.99: DE86013832	MN -34A	11:49441
CONF-860893-	(International symposium on fundamental research strategy in the development of new materials for efficient energy conversion, Osaka, Japan, 25-27 Aug 1986)			
1	*See* UCRL-94731	E 1.99: DE86014434	MN -93	11:48216

Report Number	Availability Source	File Number	Distribution Category	Abstract Number
CONF-860894-	(4. international RILEM symposium on creep and shrinkage of concrete: mathematical modeling, Evanston, IL, USA, 26-29 Aug 1986)			
1	*See* UCRL-94282	E 1.99: DE86014437	MN -25	11:48295
CONF-860895-	(14. international conference on defects in semiconductors, Paris, France, 18-22 Aug 1986)			
3	*See* SAND-86-1381C	E 1.99: DE86014720	MN -25	11:48025
CONF-860901-	(10. CIB congress on advancing building technology, Washington, DC, USA, 21-26 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86008981	MN -95d	11:47832
CONF-860903-	(IEEE-Industry Applications Society annual meeting, Denver, CO, USA, 28 Sep-2 Oct 1986)			
1	*See* SAND-86-1600C	E 1.99: DE86013350	MN -38	11:48310
CONF-860904-	(International gas research conference, Toronto, Canada, 8-11 Sep 1986)			
1	*See* UCRL-93040	E 1.99: DE86009895	MN -4	11:48324
CONF-860906-	(Advances in reactor physics and safety meeting, Saratoga Springs, NY, USA, 17-19 Sep 1986)			
6	*See* DOE/ER/40165-1	E 1.99: DE86007603	MN -34C	11:49360
CONF-860913-	(International power sources symposium, Brighton, UK, 8-11 Sep 1986)			
2	*See* N-86-25039			11:47753
CONF-860921-	(International solvent extraction conference, Munich, F.R. Germany, 11-16 Sep 1986)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86007504	MN -4	11:48057
CONF-860926-	(Geothermal Resources Council annual meeting, Palm Springs, CA, USA, 29 Sep-1 Oct 1986)			
1	*See* SAND-86-1084C	E 1.99: DE86009854	MN -38	11:48325
2	*See* LA-UR-86-1404	E 1.99: DE86010198	MN -66	11:47436
3	*See* SAND-86-2023C	E 1.99: DE86010997	MN -66	11:47444
4	*See* SAND-86-1120C	E 1.99: DE86010999	MN -66c	11:47442
5	*See* SAND-86-1128C	E 1.99: DE86011184	MN -66a	11:47443
6	*See* EGG-M-10286	E 1.99: DE86011048	MN -66a	11:47440
7	*See* SAND-86-1127C	E 1.99: DE86011421	MN -66b	11:47439
8	*See* SAND-86-1126C	E 1.99: DE86011656	MN -66	11:47438
9	*See* LA-UR-86-2009	E 1.99: DE86012374	MN -66a	11:47435
10	*See* LBL-21727	E 1.99: DE86013473	MN -66a	11:47437
11	*See* BNL-38019	E 1.99: DE86013919	MN -66d	11:47445
CONF-860932-	(Radiological accidents, perspectives and emergency planning preparedness, Bethesda, MD, USA, 15-17 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86008499	MN -41	11:47668
CONF-860940-	(Gas cleaning at high temperatures conference, Guildford, Surrey, UK, 16-18 Sep 1986)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86005551	MN -90e	11:47202
CONF-860949-	(18. IUFRO world congress, Ljubljana, Yugoslavia, 8-12 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86008243	MN -11	11:48903
CONF-860950-	(17. international congress on high speed photography and photonics, Pretoria, South Africa, 1-5 Sep 1986)			
1	*See* UCRL-93185	E 1.99: DE86008164	MN -38	11:48294
CONF-860962-	(International Institute of Refrigeration (CRYOPRAGUE), Prague, Czechoslovakia, 8-12 Sep 1986)			
1	*See* LA-UR-86-1076	E 1.99: DE86008757	MN -38	11:48229
CONF-860963-	(International NATO workshop on languages for sensor-based control in robotics, Castelvecchio Pascoli, Italy, 1-5 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86008895	MN -32	11:49610
CONF-860966-	(Space electronics conference, Albuquerque, NM, USA, 9-11 Sep 1986)			
1	*See* SAND-86-0845C	E 1.99: DE86009025	MN -38	11:48309
CONF-860967-	(ACM conference on object oriented programming systems, languages, and applications, Portland, OR, USA, 29 Sep-2 Oct 1986)			
1	*See* UCRL-94377	E 1.99: DE86009686	MN -32	11:49627
CONF-860968-	(3. international conference on the science of technology of zirconia, Tokyo, Japan, 9-11 Sep 1986)			
1	*See* SAND-86-7115C	E 1.99: DE86013575	MN -94c	11:47755
CONF-860983-	(Oceans '86, Washington, DC, USA, 23-25 Sep 1986)			
1	*See* SERI/TP-253-2965	E 1.99: DE86010710	MN -64	11:47413
CONF-860984-	(British national committee for electroheat, heating, and processing conference, Cambridge, UK, 23-26 Sep 1986)			
1	*See* IS-M-574	E 1.99: DE86011398	MN -90d	11:47199
CONF-860985-	(International symposium on rock stress and rock stress measurements, Stockholm, Sweden, 1-3 Sep 1986)			
1	*See* UCRL-93645	E 1.99: DE86010975	MN -85	11:47287
CONF-8609101-	(International conference on power beam technology, Brighton, UK, 10-12 Sep 1986)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86011076	MN -25	11:47924

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CONF-8609108-	(International symposium on the scientific bases for the preparation of heterogeneous catalysts, Louvain-La-Neuve, Belgium, 1-5 Sep 1986)			
1	*See* SAND-86-0824C	E 1.99: DE86012278	MN -25	11:48024
CONF-8609110-	(International conference on solid state nuclear track detectors, Rome, Italy, 23-27 Sep 1986)			
1	*See* PNL-SA-13220	E 1.99: DE86011121	MN -37	11:48611
CONF-8609116-	(3. international conference on numerical methods for non-linear problems, Dubrovnik, Yugoslavia, 15-18 Sep 1986)			
1	*See* UCRL-94800	E 1.99: DE86013221	MN -34	11:49102
CONF-8609117-	(19. congress of the International Association of Hydrogeologists, Karlovy Vary, Czechoslovakia, 8-15 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013396	MN -70B	11:47306
CONF-8609118-	(C.I.G.R.E. meeting, Paris, France, 4 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013253	MN -97	11:47484
CONF-8609119-	(Building design and construction conference, Beijing, China, 1-3 Sep 1986)			
1	*See* UCRL-94815	E 1.99: DE86013023	MN -20b	11:49581
CONF-8609120-	(NATO workshop on the design, activation and transformation of organometallics into common and exotic materials, Cape d'Agde, France, 1-5 Sep 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013402	MN -25	11:47976
2	*See* SAND-86-1701C	E 1.99: DE86014149	MN -25	11:48027
CONF-8609122-	(15. North American Thermal Analysis Society conference, Cincinnati, OH, USA, 21-24 Sep 1986)			
1	*See* SAND-86-1601C	E 1.99: DE86013353	MN -25	11:48026
CONF-861015-	(Joint conference of the American Society of Lubrication Engineers and the American Society of Mechanical Engineers, Pittsburgh, PA, USA, 19-22 Oct 1986)			
2	*See* N-86-25473			11:48022
COO-				
2383-0120	*See* DOE/ER/02383-0120	E 1.99: DE86014662	MN -32	11:49612
3139-51	*See* DOE/EV/03139-51	E 1.99: DE86014663	MN -48	11:48906
CPT-				
85-002	*See* DOE/ER/03992-578	E 1.99: DE86014621	MN -34D	11:49181
CWD-				
4-3	NTIS, PC A02/MF A01			11:47451
DESY-				
86-035	NTIS (US Sales Only), PC A02/MF A01	DE86752384	MN -34D	11:49145
DFVLR-FB-				
86-15	NTIS (US Sales Only), PC A04/MF A01; 1	DE86752675	MN -11	11:48664
DGRST-				
81-D-0512	NTIS (US Sales Only), PC A05/MF A01; 1	DE86752844	MN -92	11:47228
81-D-0513	*See* DGRST-81-D-0512	DE86752844	MN -92	11:47228
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T1	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE86010592	MN -60	11:47457
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T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86013887	MN -23	11:47351
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8	NTIS, PC A11/MF A01; 1 (GPO Dep.)	E 1.99: DE86000285	STD -92a	11:47215
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696	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014537	MN -97c	11:47817
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5	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86012925	MN -60	11:47458
8	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86012911	MN -60	11:47453
9	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86012860	MN -60	11:47452
10	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86012863	MN -60	11:47454
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1	NTIS, PC A14/MF A01; 1 (GPO Dep.)	E 1.99: DE86013878	MN -11	11:47380
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1	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE86014192	MN -11	11:48781
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0121/ 1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014953	MN -94c	11:47752
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T3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013244	MN -63	11:47387
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T16	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014165	MN -96	11:47902
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DOE/CH/10211-				
5	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014153	MN -23	11:47352
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DOE/CS/50101-				
T15	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99: DE86014038	MN -96	11:47899

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DOE/DP/00539-057	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014090	STD -41	11:48685
DOE/DP/50039-T1	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE86013943	MN -13	11:48655
DOE/EIA-0095(85)	NTIS, PC A13/MF A01 - GPO; 1 (GPO Dep.)	E 1.99: DE86014788	MN -98E	11:47818
DOE/EIA-0473(85)	NTIS, PC A04/MF A01; 1 - GPO (GPO Dep.)	E 1.99: DE86014787	MN -98E	11:47782
DOE/EIA-0494	NTIS, PC A12/MF A01 - GPO; 1 (GPO Dep.)	E 1.99: DE86014116	MN -32	11:49611
DOE/ER-0289	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86014211	MN -11	11:48813
DOE/ER/02383-0120	NTIS, PC A08/MF A01 (GPO Dep.)	E 1.99: DE86014662	MN -32	11:49612
DOE/ER/02853-29	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013356	MN -34C	11:49387
DOE/ER/02853-30	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013355	MN -34C	11:49388
DOE/ER/03509-22	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86014676	MN -34D	11:49122
DOE/ER/03992-554	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE86014632	MN -34D	11:49179
DOE/ER/03992-557	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014630	MN -34D	11:49146
DOE/ER/03992-561	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014626	MN -34D	11:49180
DOE/ER/03992-567	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014625	MN -34D	11:49147
DOE/ER/03992-568	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014624	MN -34D	11:49148
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DOE/ER/04207-18	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99: DE86010291	MN -80	11:47645
DOE/ER/10229-23	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014352	MN -80	11:47646
DOE/ER/10706-T1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014072	MN -34C	11:49255
DOE/ER/10719-T3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014252	MN -34B	11:48964
DOE/ER/10759-6	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013985	MN -28	11:48382
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DOE/ER/13001-18	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014254	MN -34C	11:49389
DOE/ER/13124-2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013986	MN -11	11:48930
DOE/ER/13414-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014685	MN -11	11:48945
DOE/ER/25010-T1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014683	MN -32	11:49613
DOE/ER/30063-H2	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86013158	MN -96	11:47868
DOE/ER/40048-26-N6	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014282	MN -34D	11:49219
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DOE/ER/40048-29-N6	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014284	MN -34D	11:49183
DOE/ER/40048-162	NTIS, PC A02/MF A01; 1	DE86013147	MN -34C	11:49349
DOE/ER/40048-163-L6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013146	MN -34D	11:49123
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DOE/ER/40068-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014311	MN -34D	11:49390
DOE/ER/40105-572	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014809	MN -34D	11:49149
DOE/ER/40108-5	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014707	MN -34D	11:49184
DOE/ER/40165-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86007603	MN -34C	11:49360
DOE/ER/40165-4	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013663	MN -34C	11:49361
DOE/ER/40201-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014708	MN -34D	11:49150
DOE/ER/40233-T1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013957	MN -34D	11:49185
DOE/ER/45023-3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014896	MN -25	11:48019
DOE/ER/45079-T1	NTIS, PC A02; 3	DE86014642	MN -25	11:49438
DOE/ER/45097-T2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86009224	MN -25	11:47977
DOE/ER/45142-3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013658	MN -25	11:47903
DOE/ER/45144-T2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013958	MN -34D	11:49186
DOE/ER/45151-2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014684	MN -25	11:48020
DOE/ER/45182-2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014348	MN -25	11:47925
DOE/ER/45189-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014478	MN -34	11:49439

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DOE/ER/53188-T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014243	MN -20d	11:49069
DOE/ER/53222-T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013666	MN -20	11:49478
DOE/ER/60246-1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011485	MN -11	11:48733
DOE/ER/60376-12b	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013057	MN -11	11:48931
DOE/ER/60393-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014680	MN -48	11:48828
DOE/ER/60397-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014035	MN -11	11:48665
DOE/ER/60402-1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013991	STD -48	11:48829
DOE/ER/60415-2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014677	MN -34	11:49099
DOE/ET-11448-T1	NTIS$16.50				11:47786
20009-T1	NTIS$19.50				11:47361
DOE/ET/10532-T32	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014976	MN -90d	11:47147
DOE/ET/13011-T1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013983	MN -90e	11:47203
DOE/ET/29078-T2	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014715	MN -48	11:48928
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237	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014390	MN -20	11:49481
239	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014391	MN -20	11:49482
240	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014392	MN -20	11:49483
244	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014393	MN -20a	11:49484
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DOE/EV/03333-T6	MIT, 77 Massachusetts Ave., Cambridge, MA 02139		TI86012565	ND -48	11:48801
T8	Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, MA 02139		TI86012566	ND -48	11:49433
DOE/EV/04533-8	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014661	MN -48	11:48802
DOE/EV/10417-1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014813	MN -48	11:48830
DOE/FC/10616-2130	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86015095	STD -90i	11:47483
DOE/FE-0067	NTIS, PC A05/MF A01 (GPO Dep.)	E 1.99:	DE86015107	MN -90d	11:47148
DOE/FE/60177-2152	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014286	STD -91	11:47247
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2091	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014274	STD -90b	11:47197
2093	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014276	STD -90	11:47180
2094	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014277	STD -90a	11:47181
2095	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014278	STD -90	11:47153
2096	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014279	STD -90a	11:47182
DOE/ID/01745-T10	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014379	MN -90g	11:47826
DOE/ID/12155-T1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014909	MN -97e	11:47376
T2	NTIS, PC A15; 3		DE86014910	MN -97e	11:47377
DOE/ID/12502-1	NTIS, PC A10/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014115	STD -95f	11:47886
DOE/ID/12524-T1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014383	MN -66a	11:48932
DOE/ID/12539-T1	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014122	MN -95f	11:47887
DOE/LC/10036-2009-Vol.1	NTIS, PC A22/MF A01; 1 (GPO Dep.)	E 1.99:	DE86006610	MN -91	11:47244
2009-Vol.2	NTIS, PC A22/MF A01; 1 (GPO Dep.)	E 1.99:	DE86006611	MN -91	11:47245
2009-Vol.3	NTIS, PC A20/MF A01; 1 (GPO Dep.)	E 1.99:	DE86006612	MN -91	11:47246
DOE/LC/10916-1984	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86001096	STD -91	11:47241
DOE/MA-0240	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014326	MN -13	11:49596

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DOE/MC/16426-19	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99: DE86000293	STD -92a	11:47216
DOE/MC/19207-2133	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99: DE86013321	MN -90c	11:47154
DOE/MC/20183-2074	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE86006633	STD -90c	11:47155
DOE/MC/21048-2067	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE86006623	MN -90i	11:47156
DOE/MC/21171-2069	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE86006627	STD -90e	11:47204
DOE/MC/21289-2064	NTIS, PC A05/MF A01 (GPO Dep.)	E 1.99: DE86014207	STD -90a	11:47205
DOE/MC/21377-2154	NTIS, PC A20/MF A01; 1 (GPO Dep.)	E 1.99: DE86014074	STD -90c	11:49614
2155	NTIS, PC A12/MF A01; 1 (GPO Dep.)	E 1.99: DE86014073	STD -90c	11:47157
2156	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE86013961	STD -90c	11:47158
2158	NTIS, PC A99/MF A01; 1 (GPO Dep.)	E 1.99: DE86014075	STD -90c	11:47159
DOE/METC-86/ 0228	NTIS, PC A05/MF A01 (GPO Dep.)	E 1.99: DE86001032	STD -90	11:47160
86/ 6038	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE86006607	MN -90c	11:47161
86/ 6044	NTIS, PC A08/MF A01; 1 (GPO Dep.)	E 1.99: DE86006620	MN -90	11:47869
DOE/NASA-0005-3	NTIS, PC A07/MF A01; 1	TI86013617	STD -60	11:47459
1005-9	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86010333	STD -38	11:48328
DOE/NBM-1053	NTIS, PC A15/MF A01; 1 (GPO Dep.)	E 1.99: DE86014786	MN -20d	11:49549
6012187	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86012187	MN -20e	11:49550
6014858	NTIS, PC A09/MF A01 (GPO Dep.)	E 1.99: DE86014858	MN -98E	11:47819
DOE/NE/37945-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014668	MN -80	11:47669
DOE/OR/00033-T202	NTIS, PC A18/MF A01 (GPO Dep.)	E 1.99: DE86014196	MN -97c	11:47820
DOE/OR/21411-T1	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99: DE86014424	MN -96	11:47978
DOE/PC/40795-T3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE85008831	MN -90	11:47362
DOE/PC/50798-T14	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014358	MN -90c	11:47162
DOE/PC/60779-T2	NTIS, PC A05/MF A01 (GPO Dep.)	E 1.99: DE86014827	MN -90a	11:48136
DOE/PC/62999-10	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86010887	MN -90a	11:47210
DOE/PC/70003-T10	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE86014031	MN -90d	11:47198
DOE/PC/70028-T7	NTIS, PC A11/MF A01; 1 (GPO Dep.)	E 1.99: DE86014659	MN -90d	11:47363
DOE/PC/70782-7	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014025	MN -90a	11:47183
DOE/PC/70786-T6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013314	MN -90d	11:47163
DOE/PC/70791-T4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013276	MN -90a	11:47184
T5	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014160	MN -90a	11:47164
DOE/PC/70794-7	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013317	MN -90e	11:47206
DOE/PC/70801-T7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013652	MN -90d	11:47165
DOE/PC/70809-T10	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013551	MN -90	11:47364
DOE/PC/71257-T7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013559	MN -90d	11:47166
DOE/PC/71504-5	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86014732	MN -90e	11:47207
DOE/PC/80023-T5	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014251	MN -90d	11:47167
DOE/PC/80509-T3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013959	MN -90d	11:47168
DOE/PC/80533-T3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013588	MN -90a	11:47185
DOE/PC/81201-T3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013888	MN -90a	11:47169
DOE/R0/00484-T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86012979	MN -60	11:47460
DOE/R0/01242-T1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013098	MN -60	11:47461
DOE/RA-50137-1	NTIS$24.00			11:47170
DOE/RA/01699-5	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014204	STD -97e	11:47378
DOE/RA/50664-1	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99: DE86012872	MN -60	11:47462
DOE/RL/01830-T46	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86014215	MN -70	11:48734

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DOE/RW-0038	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014823	MN -70	11:47307
DOE/SF/00515-T65	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014120	MN -28	11:48336
DOE/SF/11564-17	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86000286	STD -92a	11:47217
DOE/SF/11682-T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014018	MN -66b	11:47446
DOE/SF/11930-1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014824	MN -59A	11:47429
DOE/SF/11936-T1	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014161	MN -62	11:47433
DOE/SF/15774-T1	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014699	MN -95d	11:47855
DOE-tr-6901172	NTIS (US Sales Only), PC A03/MF A01; 1		DE86901172	MN -80	11:47744
DP-1722	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014331	STD -70	11:47308
DPh-N-2268	*See* CEA-CONF-7913		DE86750876	MN -34C	11:49383
DPh-N-S-2275	*See* CEA-CONF-7946		DE86750847	MN -34C	11:49348
2282	*See* CEA-CONF-8014		DE86750849	MN -34C	11:49118
2283	*See* CEA-CONF-8021		DE86750848	MN -34C	11:49339
DPST-84-537	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011832	MN -11	11:47309
85-1-11	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86008913	MN -80	11:47651
86-1-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86008909	MN -80	11:47652
DRET-83-1328-DS-SR	NTIS (US Sales Only), PC E07/MF A01		TI86752841	MN -34	11:48256
E-2328-1	*See* N-86-24839				11:47983
2680	*See* N-86-25284				11:48009
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ECN-179	NTIS (US Sales Only), PC A03/MF A01		DE86703217	MN -32	11:49318
181	NTIS (US Sales Only), PC A05/MF A01		DE86703197	MN -37	11:48441
EGG-2444	*See* NUREG/CR-3453		TI86009873	MN -80	11:47727
10282-1114	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014026	MN -32	11:49615
EGG-J-01586	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013457	MN -38	11:48281
EGG-M-01286	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013489	MN -20	11:49551
06485	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013464	MN -38	11:48291
08185	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013341	MN -34C	11:48442
10286	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011048	MN -66a	11:47440
15186	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013451	MN -34C	11:49300
22985	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013469	MN -2	11:47647
EGG-M-T-0286	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013459	MN -71	11:47284
ENDF-341	*See* ORNL/TM-9964	E 1.99:	DE86014340	MN -34C	11:49292
ENEA-RT-TIB-86/ 5	NTIS (US Sales Only), PC A02/MF A01		DE86901526	MN -4	11:48058
EPA-600/ 4-86/ 022	*See* DOE/DP/00539-056	E 1.99:	DE86014406	STD -41	11:48684
600/ 4-86-030	*See* DOE/DP/00539-057	E 1.99:	DE86014090	STD -41	11:48685
EPA/520/5-76/ 020	*See* PB-86-210531/XAB				11:47317
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EPRI-AP-4528	Research Reports Center, Box 50490, Palo Alto, CA 94303		TI86920265	ND -60	11:47463
4586	Research Reports Center, Box 50490, Palo Alto, CA 94303		TI86920304	ND -60	11:47464
4590	Research Reports Center, Box 50490, Palo Alto, CA 94303		TI86920321	ND -60	11:47465
4591	Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303		TI86920367	ND -60	11:47455
4608	Research Reports Center, Box 50490, Palo Alto, CA 94303		TI86920415	ND -62a	11:47430
4638	Research Reports Center, Box 50490, Palo Alto, CA 94303		TI86920352	ND -60	11:47466

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4639	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920351	ND -60	11:47467
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4666	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920418	ND -90h	11:47926
4688	Reserach Reports Center, Box 50490, Palo Alto, CA 94303	TI86920416	ND -90h	11:47927
4699-Vol.1	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920417	ND -90d	11:47192
4727	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920419	ND -90h	11:47928
EPRI-EL-				
4388	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920424	ND -97a	11:47487
4522-Vol.1	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920422	ND -97	11:47475
4522-Vol.2	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920423	ND -97	11:47476
4632-Vol.1	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920425	ND -97c	11:47821
4632-Vol.2	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920426	ND -97c	11:47822
4729	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920427	ND -97c	11:47477
EPRI-EM-				
4568	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920402	ND -38	11:47929
4599-Vol.1	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920430	ND -94e	11:47379
4643	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920370	ND -97b	11:47480
4689	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920428	ND -96	11:47900
4722	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920429	ND -94a	11:47749
EPRI-NP-				
4483-Vol.1	Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303	TI86920263	ND -80	11:47632
4550	Research Reports Center, Box 50490, Palo Alto, CA 94303; 1	TI86920433	ND -78	11:47497
4551	Research Reports Center, Box 50490, Palo Alto, CA 94303; 1	TI86920436	ND -78	11:47498
4625	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920432	ND -80	11:47623
4648	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920406	ND -78	11:47499
4665-S-SR	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920431	ND -80	11:47624
4698	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920434	ND -78	11:47500
4705	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920435	ND -78	11:47625
EPRI-P-				
4542	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920437	ND -90	11:47481
EPRI-RD-				
4649-Vol.1	Research Reports Center, Box 50490, Palo Alto, CA 94303	TI86920438	ND -25	11:47930
ERC-R-				
86020A	NTIS, PC A14/MF A01; 1 (GPO Dep.)	E 1.99: DE86014455	MN -59A	11:47418
86020B	NTIS, PC A12/MF A01; 1 (GPO Dep.)	E 1.99: DE86014456	MN -59A	11:47419
86020C	NTIS, PC A16/MF A01; 1 (GPO Dep.)	E 1.99: DE86014457	MN -59A	11:47420
86020D	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99: DE86014458	MN -59A	11:47421
ESA-CR(P)-				
2118	*See* LAAS-755			11:47391
EUR-				
9595	NTIS (US Sales Only), PC A03/MF A01	DE86750857	MN -80	11:47626
9844	NTIS (US Sales Only), PC A04/MF A01	DE86750856	MN -70	11:47310
9943-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities		ND -61	11:47365
10014-EN-FR	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities		ND -61A	11:47388
10033-FR	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities		ND -25	11:47931
10146-IT	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities		ND -61A	11:47389
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10152-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -4	11:47359
10294-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -4	11:48059
10295-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -11	11:48666
10352-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -98	11:47769
10353-EN-FR	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -11	11:48657
10364-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -4	11:48713
10366-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -90a	11:47186
10380-EN	Commission of the European Communities, Luxembourg. Office of Official Publications of the European Communities			ND -4	11:48060
FhG-W-					
8/ 85	NTIS (US Sales Only), PC A07/MF A01; 1		DE86752674	MN -25	11:47932
FLPU-					
84-6	NTIS (US Sales Only), PC A03/MF A01		DE86703210	MN -70	11:47311
84-8	NTIS (US Sales Only), PC A02/MF A01		DE86703211	MN -70	11:47312
FNAL/C-					
86/ 52-E	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014371	MN -28	11:48354
86/ 102-E	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014372	MN -34D	11:49124
FNAL-TM-					
1403	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014465	STD -28	11:48383
1405	NTIS, PC A02/MF A01		DE86014462	STD -28	11:48355
1406	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014464	STD -28	11:48384
1407	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014468	STD -28	11:48356
1409	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014463	STD -28	11:48385
1412	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014466	STD -28	11:48386
FRNC-TH-					
2125	NTIS (US Sales Only), PC A07/MF A01		DE86750852	MN -20g	11:49485
2127	NTIS (US Sales Only), PC A05/MF A01		DE86750854	MN -25	11:47933
2160	NTIS (US Sales Only), PC A10/MF A01		DE86750851	MN -37	11:48443
2165	NTIS (US Sales Only), PC A06/MF A01		DE86750855	MN -41	11:47340
2224	NTIS (US Sales Only), PC A12/MF A01		DE86752843	MN -34	11:48257
FTD-ID(RS)T-					
0004-86	*See* AD-A-167846/5/XAB				11:48265
GA-A-					
18227	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014034	MN -20	11:49486
18454	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014028	MN -21	11:49487
18455	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014030	MN -21	11:49552
GAO/RCED-					
85-115	US General Accounting Office, Box 6015, Gaithersburg, MD 20877		TI85901760	MN -92	11:47225
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21-5418	*See* N-86-24938				11:47895
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137	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013557	MN -16	11:47344
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86/ E/ 14	NTIS PC E11; Available from NTIS as TIB/B86-08654			ND -80	11:47704
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1058	*See* BMI-1985-096		DE86752610	MN -80	11:47630
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6/ 85	NTIS (US Sales Only), PC A03/MF A01		DE86752604	MN -48	11:48831
7/ 85	NTIS (US Sales Only), PC A06/MF A01		DE86752608	MN -48	11:48832
26/ 85	NTIS (US Sales Only), PC A04/MF A01		DE86752612	MN -41	11:49434
42/ 85	NTIS (US Sales Only), PC A03/MF A01		DE86752607	MN -70	11:47313
GSF-S-					
1221	*See* GSF-6/85		DE86752604	MN -48	11:48831
1285	*See* GSF-7/85		DE86752608	MN -48	11:48832
GSF-T-					
225	*See* GSF-42/85		DE86752607	MN -70	11:47313
GTFR-					
65	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014754	MN -20	11:47934
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2004/ DN/ 010	*See* HE-TP-27930		DE86703167	MN -71	11:47285
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27930	NTIS (US Sales Only), PC A04/MF A01		DE86703167	MN -71	11:47285
HEDL-					
7560	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014756	MN -70	11:47979
7577	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014757	MN -70	11:47980
7591	NTIS, PC A05/MF A01 - GPO		TI86014374	MN -78	11:47491

Report Number	*Availability Source*	*File Number*	*Distribution Category*	*Abstract Number*
HEDL-SA-				
3423-FP	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014759	MN -20c	11:47935
HEHF-				
54-85	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014793	MN -48	11:48833
IAE-				
1965/ CYFRONET/ PM/ A	Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland		ND -34D	11:49453
IAEA-SM-				
285/ 21	*See* PNL-SA-13454	E 1.99: DE86013340	MN -41	11:48897
286-237-P	*See* EGG-M-T-0286	E 1.99: DE86013459	MN -71	11:47284
IAEA-TECDOC-				
361	NTIS (US Sales Only), PC A18/MF A01	DE86703159	MN -51	11:47248
362	NTIS (US Sales Only), PC A09/MF A01	DE86703160	MN -11	11:48714
363	NTIS (US Sales Only), PC A10/MF A01	DE86703195	MN -37	11:48302
ICRM-S-				
13	*See* ECN-181	DE86703197	MN -37	11:48441
IFP-				
33-730	NTIS (US Sales Only), PC A16/MF A01; 1	DE86753179	MN -92b	11:47220
IFP-RA-				
1985	NTIS (US Sales Only), PC A04/MF A01; 1	DE86752842	MN -92	11:47213
IFSR-				
230	*See* DOE/ET/53088-230	E 1.99: DE86014389	MN -20	11:49480
237	*See* DOE/ET/53088-237	E 1.99: DE86014390	MN -20	11:49481
239	*See* DOE/ET/53088-239	E 1.99: DE86014391	MN -20	11:49482
240	*See* DOE/ET/53088-240	E 1.99: DE86014392	MN -20	11:49483
244	*See* DOE/ET/53088-244	E 1.99: DE86014393	MN -20a	11:49484
IFUSP-P-				
518	NTIS (US Sales Only), PC A02/MF A01	DE86703111	MN -34D	11:49391
549	NTIS (US Sales Only), PC A02/MF A01	DE86703115	MN -34A	11:49440
IIUG/dp-				
84-1	NTIS as TIB/B86-08608		ND -11	11:48783
85-23	NTIS (US Sales Only), PC A05/MF A01; 1	DE86752562	MN -98	11:47770
IIUG-pre-				
85-6	NTIS PC E02; Available from NTIS as TIB/A86-08609		ND -11	11:48790
85-10	NTIS as TIB/B86-08607		ND -11	11:48667
IKE-				
4-121	NTIS (US Sales Only), PC A03/MF A01	DE86752578	MN -78	11:47501
6-151	NTIS (US Sales Only), PC A06/MF A01	DE86752587	MN -80	11:47502
INDC(BUL)-				
011/ L	NTIS (US Sales Only), PC A02/MF A01	DE86703141	MN -46	11:49420
INDC(CCP)-				
251/ L	NTIS (US Sales Only), PC A02/MF A01	DE86703179	MN -80	11:47512
253/ L	NTIS (US Sales Only), PC A02/MF A01	DE86703142	MN -46	11:49421
254/ L	NTIS (US Sales Only), PC A02/MF A01	DE86703143	MN -46	11:49422
INDC(JPN)-				
106/ L	*See* NEANDC(J)-120/U	TI86901587	ND -34C	11:49223
107/ L	*See* NEANDC(J)-121/U	TI86901539	ND -34C	11:49363
INIS-BR-				
488	NTIS (US Sales Only), PC A10/MF A01	DE86703231	MN -34A	11:48021
490	NTIS (US Sales Only), PC A05/MF A01	DE86703247	MN -4	11:48137
INIS-GB-				
7	NTIS (US Sales Only), PC A03/MF A01	DE86703200	MN -70	11:47314
8	NTIS (US Sales Only), PC A03/MF A01	DE86703168	MN -71	11:47286
INIS-mf-				
9897	NTIS (US Sales Only), PC A08/MF A01	DE86752570	MN -86	11:47277
9899	NTIS (US Sales Only), PC A07/MF A01	DE86752573	MN -11	11:48735
9900	NTIS (US Sales Only), PC A04/MF A01	DE86752572	MN -41	11:49435
10138	NTIS (US Sales Only), PC A07/MF A01	DE86703223	MN -2	11:47778
10144	NTIS (US Sales Only), PC A06/MF A01	DE86703161	MN -48	11:48834
10145	NTIS (US Sales Only), PC A06/MF A01	DE86703157	MN -25	11:47941
10151	NTIS (US Sales Only), PC A04/MF A01	DE86703246	MN -4	11:48061
10172	NTIS (US Sales Only), PC A06/MF A01	DE86780481	MN -48	11:48843
10173	NTIS (US Sales Only), PC A05/MF A01	DE86703196	MN -37	11:48444
10174	NTIS (US Sales Only), PC A07/MF A01	DE86703198	MN -37	11:48559
10175	NTIS (US Sales Only), PC A04/MF A01	DE86752569	MN -48	11:48792
10176	NTIS (US Sales Only), PC A06/MF A01	DE86752568	MN -4	11:48075
10178	NTIS (US Sales Only), PC A03/MF A01	DE86752584	MN -34C	11:49428
10179	NTIS (US Sales Only), PC A08/MF A01	DE86752579	MN -34D	11:49125
10183	NTIS (US Sales Only), PC A05/MF A01	DE86752586	MN -48	11:48855
10186	NTIS (US Sales Only), PC A07/MF A01	DE86752576	MN -80	11:47705
10187	NTIS (US Sales Only), PC A04/MF A01	DE86752574	MN -80	11:47610
10188	NTIS (US Sales Only), PC A05/MF A01	DE86752575	MN -80	11:47633
10189	NTIS (US Sales Only), PC A06/MF A01	DE86752581	MN -11	11:48955
10190	NTIS (US Sales Only), PC A06/MF A01	DE86752582	MN -34C	11:49259
10191	NTIS (US Sales Only), PC A05/MF A01	DE86752588	MN -37	11:48603
10192	NTIS (US Sales Only), PC A05/MF A01	DE86752589	MN -48	11:48805
10194	NTIS (US Sales Only), PC A06/MF A01	DE86752591	MN -48	11:48797
10195	NTIS (US Sales Only), PC A16/MF A01	DE86752592	MN -48	11:48856
10196	NTIS (US Sales Only), PC A04/MF A01	DE86752585	MN -34D	11:49126
10197	NTIS (US Sales Only), PC A05/MF A01	DE86752596	MN -80	11:47629
10199	NTIS (US Sales Only), PC A09/MF A01	DE86752601	MN -34C	11:49407

Report Number	Availability Source	File Number	Distribution Category	Abstract Number
10200	NTIS (US Sales Only), PC A06/MF A01	DE86752603	MN -34C	11:49352
10201	NTIS (US Sales Only), PC A10/MF A01	DE86752602	MN -13	11:49600
10202	NTIS (US Sales Only), PC A04/MF A01	DE86752577	MN -80	11:47713
10203	NTIS (US Sales Only), PC A02/MF A01	DE86752595	MN -86	11:47280
10402	NTIS (US Sales Only), PC A04/MF A01	DE86780480	MN -48	11:48857
10404	NTIS (US Sales Only), PC A06/MF A01	DE86703222	MN -2	11:47779
10406	NTIS (US Sales Only), PC A12/MF A01	DE86703135	MN -34B	11:48969
10407	NTIS (US Sales Only), PC A09/MF A01	DE86703151	MN -34C	11:49320
10408	NTIS (US Sales Only), PC A05/MF A01	DE86703172	MN -28	11:48387
10409	NTIS (US Sales Only), PC A07/MF A01	DE86703150	MN -34C	11:49260
10410	NTIS (US Sales Only), PC A06/MF A01	DE86703152	MN -34C	11:49362
10411	NTIS (US Sales Only), PC A06/MF A01	DE86703113	MN -34A	11:49070
10412	NTIS (US Sales Only), PC A07/MF A01	DE86703116	MN -34A	11:49429
10417	NTIS (US Sales Only), PC A14/MF A01	DE86703233	MN -34B	11:48970
INP-				
1162/ D	NTIS (US Sales Only), PC A03/MF A01	DE86703162	MN -48	11:48697
INPE-				
3809-PRE/ 895	*See* N-86-25316			11:49006
INR-				
1930/ IA/ PL/ A	Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland		ND -34C	11:49408
1931/ 1/ 9A/ PL/ A	Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland		ND -34C	11:49329
1943/ 6,7/ PH/ A	Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland		ND -34D	11:49151
1950/ IA/ PL/ A	Energetics and Atomic Energy Information Centre, Palace of Culture and Science, PL-00-901 Warsaw, Poland		ND -34C	11:49321
INS-				
530	NTIS (US Sales Only), PC A03/MF A01	DE86703107	MN -34D	11:49187
532	NTIS (US Sales Only), PC A02/MF A01	DE86703146	MN -34C	11:49233
534	NTIS (US Sales Only), PC A02/MF A01	DE86703147	MN -34C	11:49409
535	NTIS (US Sales Only), PC A03/MF A01	DE86703148	MN -34C	11:49410
536	NTIS (US Sales Only), PC A03/MF A01	DE86703137	MN -34D	11:49152
537	NTIS (US Sales Only), PC A02/MF A01	DE86703235	MN -34D	11:49153
538	NTIS (US Sales Only), PC A03/MF A01	DE86703149	MN -34C	11:49411
INS-J-				
169	NTIS (US Sales Only), PC A03/MF A01	DE86703169	MN -28	11:48388
INS-PT-				
33	NTIS (US Sales Only), PC A04/MF A01	DE86703219	MN -32	11:49616
IPNO-DRE-				
85-05	NTIS (US Sales Only), PC A03/MF A01	DE86750872	MN -37	11:48604
IPPCZ-				
245	NTIS (US Sales Only), PC A02/MF A01	DE86703128	MN -20	11:49488
IPPJ-				
728	NTIS (US Sales Only), PC A02/MF A01	DE86703119	MN -20	11:49071
729	NTIS (US Sales Only), PC A02/MF A01	DE86703120	MN -20	11:49489
730	NTIS (US Sales Only), PC A02/MF A01	DE86703121	MN -20	11:49072
731	NTIS (US Sales Only), PC A02/MF A01	DE86703122	MN -20	11:49073
733	NTIS (US Sales Only), PC A04/MF A01	DE86703123	MN -20	11:49490
IPPJ-DT-				
115	NTIS (US Sales Only), PC A06/MF A01	DE86703134	MN -20	11:49554
IS-M-				
574	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86011398	MN -90d	11:47199
JAERI-M-				
84-219	NTIS (US Sales Only), PC A04/MF A01	DE86703180	MN -80	11:47619
84-237	NTIS (US Sales Only), PC A14/MF A01	DE86703190	MN -78	11:47719
84-244	NTIS (US Sales Only), PC A06/MF A01	DE86703220	MN -32	11:49430
85-016	NTIS (US Sales Only), PC A04/MF A01	DE86703193	MN -80	11:47648
85-021	NTIS (US Sales Only), PC A03/MF A01	DE86703194	MN -80	11:47649
85-027	NTIS (US Sales Only), PC A05/MF A01	DE86703191	MN -78	11:47720
85-029	NTIS (US Sales Only), PC A10/MF A01	DE86703184	MN -78	11:47721
85-032	NTIS (US Sales Only), PC A02/MF A01	DE86703181	MN -80	11:47638
85-034	NTIS (US Sales Only), PC A10/MF A01	DE86703182	MN -80	11:47620
85-037	NTIS (US Sales Only), PC A11/MF A01	DE86703185	MN -78	11:47722
85-042	NTIS (US Sales Only), PC A02/MF A01	DE86703199	MN -37	11:48605
85-053	NTIS (US Sales Only), PC A03/MF A01	DE86703158	MN -25	11:47944
85-054	NTIS (US Sales Only), PC A02/MF A01	DE86703192	MN -77	11:47507
86-080	*See* NEANDC(J)-120/U	TI86901587	ND -34C	11:49223
86-086	*See* NEANDC(J)-121/U	TI86901539	ND -34C	11:49363
JEN-				
579	NTIS (US Sales Only), PC A04/MF A01	DE86703245	MN -4	11:48077
JET-R-				
86-02	NTIS (US Sales Only), PC A02/MF A01	DE86703232	MN -20	11:49491
Juel-				
2006	NTIS (US Sales Only), PC A06/MF A01	DE86752600	MN -25	11:47945
2024	NTIS (US Sales Only), PC A05/MF A01	DE86752571	MN -20d	11:49555
K/TS-				
11-771	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86014373	MN -25	11:48630
KAPL-				
4193	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86009673	STD -32	11:48606

Report Number	*Availability Source*	*File Number*	*Distribution Category*	*Abstract Number*
KEK-				
84-13	NTIS (US Sales Only), PC A06/MF A01	DE86703177	MN -28	11:48389
84-18	NTIS (US Sales Only), PC A05/MF A01	DE86703221	MN -32	11:49617
KFK-				
3966	NTIS (US Sales Only), PC A09/MF A01	DE86752609	MN -25	11:47981
4023	NTIS (US Sales Only), PC A08/MF A01	DE86752597	MN -28	11:48390
4071	NTIS (US Sales Only), PC A02/MF A01	DE86752598	MN -34C	11:49322
KU-HCOE-FL2-R-				
85-27	NTIS (US Sales Only), PC A02/MF A01	DE86752094	MN -34A	11:49074
L-				
16028	*See* N-86-23088			11:48668
16074	*See* N-86-25429			11:48214
16103	*See* N-86-24962			11:47237
LA-				
154/ 86	*See* OEFZS-4356		ND -11	11:48707
10599	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014883	STD -28	11:48391
10634-MS	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99: DE86013629	STD -66a	11:47434
10663-MS	*See* NUREG/CR-4526	TI86010876	MN -77	11:47508
10672-C	NTIS, PC A99/MF A01; 1 (GPO Dep.)	E 1.99: DE86013067	STD -15	11:47345
10681	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86014881	STD -10	11:48138
10732-MS	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE86014886	STD -70	11:47315
10753-T	NTIS, PC A21/MF A01; 1 (GPO Dep.)	E 1.99: DE86014879	STD -34	11:47946
10768-MS	NTIS, PC A08/MF A01; 1 (GPO Dep.)	E 1.99: DE86014887	STD -70B	11:47338
10788-MS	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86014878	MN -13	11:48222
LA-UR-				
86-1076	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86008757	MN -38	11:48229
86-1404	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86010198	MN -66	11:47436
86-1481	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86010207	MN -13	11:49597
86-1596	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86011258	MN -11	11:48823
86-2009	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86012374	MN -66a	11:47435
86-2139	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86012399	MN -34C	11:49234
86-2181	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86012441	MN -4	11:48170
86-2299	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013858	MN -20f	11:49556
86-2350	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013854	MN -34B	11:49004
86-2352	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013853	MN -38	11:48230
86-2369	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013852	MN -34	11:49075
86-2371	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013851	MN -38	11:48231
86-2372	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013850	MN -38	11:48304
86-2378	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013848	MN -38	11:48232
86-2379	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013847	MN -38	11:48305
86-2381	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE86013846	MN -21	11:49492
86-2386	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013844	MN -34D	11:49188
86-2387	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013843	MN -38	11:48306
86-2388	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013842	MN -28	11:48394
86-2396	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013841	MN -41	11:48297
86-2412	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013839	MN -38	11:48307
86-2413	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013838	MN -38	11:48607
86-2419	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013837	MN -20f	11:49493
86-2507	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013833	MN -38	11:48233
86-2528	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013832	MN -34A	11:49441
86-2540	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013831	MN -34C	11:49171
86-2542	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013830	MN -38	11:48258
86-2581	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86013827	MN -11	11:48947
86-2590	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013825	MN -34B	11:48608
86-2636	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013821	MN -21	11:49557
86-2637	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013820	MN -34	11:48631
LAAS-				
755	NTIS, PC A10/MF A01			11:47391
LAL-RT-				
85-03	NTIS (US Sales Only), PC A02/MF A01	DE86750863	MN -28	11:48341
LBL-				
11386	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86013010	MN -59B	11:47856
17562	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013649	MN -59B	11:47857
20466	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013485	MN -37	11:48632
21462	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013203	MN -34C	11:49412
21532	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86012800	MN -34C	11:49323
21536	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013190	MN -28	11:48342
21580	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE86013199	MN -34C	11:49353
21650	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013200	MN -34C	11:49261
21673	NTIS, PC AA02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013009	MN -28	11:48343
21695	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013487	MN -34D	11:49154
21716	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86013472	MN -34D	11:49129
21727	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE86013473	MN -66a	11:47437
LINO-				
24	NTIS, PC A02/MF A01			11:48633
LPC-				
84-30	NTIS (US Sales Only), PC A02/MF A01	DE86750865	MN -37	11:49618
85-01	NTIS (US Sales Only), PC A02/MF A01	DE86750864	MN -37	11:48609
85-13	NTIS (US Sales Only), PC A02/MF A01	DE86750868	MN -34D	11:49155
LRAP-				
47	NTIS (US Sales Only), PC A03/MF A01	DE86703228	MN -34A	11:49076
MINTEK-M-				
209	NTIS (US Sales Only), PC A02/MF A01	DE86703153	MN -4	11:48078

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MIT/BNL-					
85-3	*See* BNL-38255	E 1.99:	DE86014126	MN -90a	11:47145
MLM-					
3362	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014266	STD -4	11:48079
3363	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014265	STD -25	11:47904
3380(OP)	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014700	MN -45	11:48650
MPI-PAE/Exp.El.-					
163	NTIS (US Sales Only), PC A03/MF A01		DE86752606	MN -37	11:48610
MRC-TSR-					
2914	*See* AD-A-167490/2/XAB				11:49368
2917	*See* AD-A-167484/5/XAB				11:49466
MRL-R-					
983	*See* AD-A-167937/2/XAB				11:48254
986	*See* AD-A-167448/0/XAB				11:47221
MS-					
6970	*See* AD-A-167415/9/XAB				11:47383
N-					
86-22713	NTIS, PC A05/MF A01				11:47892
86-22784	NTIS, PC A12/MF A01				11:49598
86-22892	NTIS, PC A05/MF A01				11:47893
86-23088	NTIS, PC A14/MF A01				11:48668
86-23089	NTIS, PC A07/MF A01				11:48940
86-23138	NTIS, PC A05/MF A01				11:48669
86-23551	NTIS, PC A04/MF A01				11:48627
86-23622	NTIS, PC A04/MF A01				11:47398
86-23856	NTIS, PC A17/MF A01				11:48322
86-24007	NTIS, PC A02/MF A01				11:47392
86-24818	NTIS, PC A09/MF A01				11:47947
86-24836	NTIS, PC A02/MF A01				11:47982
86-24839	NTIS, PC A02/MF A01				11:47983
86-24931	NTIS, PC A03/MF A01				11:48323
86-24933	NTIS, PC A10/MF A01				11:47894
86-24938	NTIS, PC A09/MF A01				11:47895
86-24961	NTIS, PC A02/MF A01				11:48213
86-24962	NTIS, PC A02/MF A01				11:47237
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77927	*See* N-86-25420				11:47997
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84-44	Also published in Phys. Lett., B (28 February 1985) v. 152(1/2) p. 59-62			ND -34D	11:49189
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3-43-7-86	Nuclear Standards Management Center, Box Y, Oak Ridge, TN 37831		TI86013422	STD -11	11:48236
3-44-7-86	N.S.M.C., Box Y, Oak Ridge, TN 37831		TI86013388	STD -11	11:48237
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120/ U	JAERI, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan		TI86901587	ND -34C	11:49223
121/ U	Japan Atomic Energy Research Institute, Dept. of Technical Information, Tokaimura, NaKa-gun, Japan		TI86901539	ND -34C	11:49363
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178	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014656	MN -92	11:47223
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2-73-4220	NTIS, PC A05/MF A01 - NMERDI, Univ. of New Mexico, 457 Washington, S.E., Albuquerque, NM 87108		DE86901583	MN -60	11:47450
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5759	*See* AD-A-167849/9/XAB				11:49470
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0833-Suppl.6	NTIS, PC A13/MF A01 - GPO		TI86901608	MN -78	11:47724

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0065	NTIS, PC A12/MF A01 - GPO		TI85901725	MN -80	11:47627
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3453	NTIS PC E06/MF A01 - GPO		TI86009873	MN -80	11:47727
3585-Vol.2	NTIS, PC A08/MF A01 - GPO		TI86901613	MN -70B	11:47341
4255-Vol.3-No.1	NTIS, PC A03/MF A01 - GPO		TI86012504	MN -78	11:47728
4367-Rev.1	NTIS, PC A04/MF A01 - GPO		TI86014238	MN -80	11:47493
4503-Vol.1	NTIS, PC A03/MF A01 - GPO		TI86007561	MN -78	11:47494
4526	NTIS, PC A03/MF A01 - GPO		TI86010876	MN -77	11:47508
4532-Vol.1	NTIS, PC A03/MF A01 - GPO		TI86901610	MN -80	11:47640
4532-Vol.2	NTIS, PC A09/MF A01 - GPO		TI86901611	MN -80	11:47641
4587	NTIS, PC A12/MF A01 - GPO		TI86901596	MN -80	11:47729
4624-Vol.1	NTIS, PC A11/MF A01 - GPO		TI86901592	MN -11	11:47730
4624-Vol.2	NTIS, PC A10/MF A01 - GPO		TI86901593	MN -11	11:47731
4624-Vol.3	NTIS, PC A05/MF A01 - GPO		TI86901589	MN -11	11:47732
4624-Vol.4	NTIS, PC A08/MF A01 - GPO		TI86901590	MN -11	11:47733
4624-Vol.5	NTIS, PC A08/MF A01 - GPO		TI86901591	MN -11	11:47734
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4356	Special print from Bodenkultur (February 1986) v. 37(1) p. 1-6			ND -11	11:48707
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0686	Institute for Biology, OEFZS, A-2444 Seibersdorf, Austria			ND -48	11:48807
0756	Institute for Biology, OEFZS, A-2444 Seibersdorf, Austria			ND -23	11:48896
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262	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014201	MN -2	11:47774
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6301	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014397	STD -79h	11:47518
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86/ 5	NTIS, PC A06/MF A01 (GPO Dep.)	E 1.99:	DE86014336	MN -90	11:47172
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9632-Vol.3-No.1	*See* NUREG/CR-4255-Vol.3-No.1		TI86012504	MN -78	11:47728
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9703	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014413	STD -20f	11:49495
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84-29	NTIS (US Sales Only), PC A02/MF A01		DE86703230	MN -34A	11:48023
85-24	NTIS (US Sales Only), PC A02/MF A01		DE86703238	MN -34D	11:49156
86-03	NTIS (US Sales Only), PC A03/MF A01		DE86703239	MN -34D	11:49157
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86-08	NTIS (US Sales Only), PC A02/MF A01		DE86703243	MN -34C	11:49343
PATENTS-US-	(US: Commissioner of Patents, Washington, D.C. 20231, USA, $1.00 per copy. Government Patent Applications available from NTIS)				
4,597,360					11:47414
4,597,832					11:47397
4,598,338					11:48318
4,598,593					11:48288
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84-P18	*See* AEEW-M-2205		DE86703203	MN -70	11:47289
85-P2	*See* AEEW-M-2204		DE86703202	MN -70	11:47288
PERG-RR-					
13	British Library Lending Division, Boston Spa, Wetherby, LS23 7BQ			ND -41	11:47342
PNL-					
5375	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014946	MN -90	11:47175
5515-Vol.2	*See* NUREG/CR-3262-Vol.2		TI86010442	MN -80	11:47726
5764	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014190	MN -11	11:48910
5830	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014820	MN -70	11:47318
5857	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010784	MN -60	11:47469
5870	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014191	MN -85	11:47644
5903	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86012223	MN -60	11:47470
5906	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86012967	MN -80	11:47599
5915	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014818	MN -70	11:47985
5919	NTIS, PC A06/MF A01 (GPO Dep.)	E 1.99:	DE86014819	MN -70	11:47319
5948	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014817	MN -23	11:48210
PNL-SA-					
13220	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011121	MN -37	11:48611
13260	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011627	MN -95d	11:47858
13422	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013595	MN -11	11:47381
13454	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013340	MN -41	11:48897
13751	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013601	MN -33	11:47600
13853	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014376	MN -61	11:47367
13923	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013599	MN -48	11:48911
14035	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013593	MN -32	11:49619
14160	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013592	MN -34D	11:49306
POLY-MRI-					
1451-86	*See* N-86-25070				11:49019
PPA-FR-					
2	Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia			ND -25	11:47949
PPA-T-					
3	Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia			ND -16	11:47346
11	Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia			ND -37	11:48612
13	Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia			ND -41	11:48698
29	Nuclear Energy Unit, Bangi, 43000 Kajang, Malaysia			ND -25	11:47950
PPLK-					
4	NTIS (US Sales Only), PC A07/MF A01		DE86703133	MN -20	11:49567
PWA-					
5968-19	*See* N-86-25003				11:47896
PWR/HTWG/P-					
85-311	*See* AEEW-R-1874		DE86703189	MN -78	11:47653
R-MECH-					
02/ 83	Akademie der Wissenschaften der DDR, Berlin. Inst. fuer Mechanik			ND -92	11:47227
RAL-					
84-116	NTIS (US Sales Only), PC A04/MF A01		DE86703112	MN -34A	11:49079
85-017	NTIS (US Sales Only), PC A03/MF A01		DE86703144	MN -46	11:49431
85-022	NTIS (US Sales Only), PC A02/MF A01		DE86703126	MN -20	11:49496
REPT-					
2	*See* BLL-RISLEY-TR-237-(9091.9F)				11:47968
21-4705	*See* N-86-23856				11:48322
76-H-088/ 089	*See* PB-86-213998/XAB				11:47234
RISLEY-Trans-					
4113	NTIS (US Sales Only), PC A02/MF A01; 1		DE85902082	MN -78	11:47521
RRK-					
85-3	NTIS (US Sales Only), PC A03/MF A01		DE86703139	MN -34D	11:49130
85-4	NTIS (US Sales Only), PC A02/MF A01		DE86703140	MN -34D	11:49191
85-6	NTIS (US Sales Only), PC A03/MF A01		DE86703109	MN -34D	11:49192
85-7	NTIS (US Sales Only), PC A02/MF A01		DE86703110	MN -34D	11:49193
85-9	NTIS (US Sales Only), PC A02/MF A01		DE86703138	MN -34D	11:49159
85-12	NTIS (US Sales Only), PC A02/MF A01		DE86703136	MN -34B	11:49013
RT/TIB-					
85/ 27	NTIS (US Sales Only), PC AA02; 3		DE86901559	MN -2	11:48084
SAAS-					
332	NTIS (US Sales Only), PC A03/MF A01		DE86703212	MN -70	11:47320
336	NTIS (US Sales Only), PC A02/MF A01		DE86703215	MN -16	11:47347
337	NTIS (US Sales Only), PC A02/MF A01		DE86703216	MN -16	11:47348
338	NTIS (US Sales Only), PC A03/MF A01		DE86703226	MN -2	11:47783
SAND-					
84-1341	NTIS, PC A04/MF A01 - GPO		TI86013165	STD -79	11:47738
84-1563	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014079	MN -38	11:48283
85-0866	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014935	MN -38	11:49620
85-2346	NTIS, PC A06/MF A01 (GPO Dep.)	E 1.99:	DE86015120	MN -32	11:49621
85-2707C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014142	MN -34	11:49100
85-2809	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014934	MN -92a	11:47441
85-8025	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014745	MN -38	11:48308
85-8184	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014744	MN -62c	11:47407
86-0046	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014792	MN -38	11:48292
86-0335C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86007827	MN -80	11:47622

Report Number	Availability Source	File Number		Distribution Category	Abstract Number
86-0809C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014146	MN -25	11:47951
86-0811	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014952	MN -11	11:49622
86-0824C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86012278	MN -25	11:48024
86-0829	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014743	MN -70	11:48956
86-0845C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86009025	MN -38	11:48309
86-1084C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86009854	MN -38	11:48325
86-1120C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010999	MN -66c	11:47442
86-1126C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011656	MN -66	11:47438
86-1127C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011421	MN -66b	11:47439
86-1128C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011184	MN -66a	11:47443
86-1381C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014720	MN -25	11:48025
86-1473	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014943	MN -32	11:48613
86-1499C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014140	MN -32	11:49623
86-1539C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86012944	MN -28	11:48358
86-1544C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86012945	MN -28	11:48634
86-1600C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013350	MN -38	11:48310
86-1601C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013353	MN -25	11:48026
86-1606	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014941	MN -37	11:48635
86-1654C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014150	MN -28	11:48359
86-1695C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014147	MN -15	11:47349
86-1701C	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014149	MN -25	11:48027
86-1706C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014370	MN -21	11:49568
86-1722C	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013565	MN -28	11:48344
86-1748C	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014112	MN -28	11:48360
86-1751C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013573	MN -34A	11:49080
86-1858C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014721	MN -91	11:47243
86-2023C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010997	MN -66	11:47444
86-2045	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014937	MN -45	11:48651
86-2068	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014945	MN -13	11:49599
86-7115C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013575	MN -94c	11:47755
86-8002	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86011388	MN -62a	11:47408
86-8011	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86013372	MN -62a	11:47409
86-8231	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014746	MN -25	11:47952
SAR-					
4	*See* N-86-24007				11:47392
SCPRI-RM-					
4-1985	NTIS (US Sales Only), PC A03/MF A01		DE86750873	MN -11	11:48699
5-1985	NTIS (US Sales Only), PC A03/MF A01		DE86750874	MN -11	11:48700
6-1985	NTIS (US Sales Only), PC A03/MF A01		DE86750875	MN -11	11:48701
SERI/SP-					
273-2911	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86010704	STD -60	11:47471
273-2937	NTIS, PC A08/MF A01; 1 (GPO Dep.)	E 1.99:	DE86004440	MN -59B	11:47859
SERI/STR-					
211-2962	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86010719	STD -63	11:47393
211-2972	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86010720	STD -63	11:47394
217-2732	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86004428	MN -60	11:47472
217-2899	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86004461	MN -60	11:47473
253-2859	NTIS, PC A11/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010703	MN -62a	11:47431
SERI/TP-					
253-2965	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010710	MN -64	11:47413
254-2999	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86010725	MN -62	11:47860
255-2995	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010727	MN -62	11:47432
SERI/TR-					
254-2841	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86010721	MN -59A	11:47423
SGD-					
499-PT-1	*See* PB-86-196086/XAB				11:49010
499-PT-2	*See* PB-86-196094/XAB				11:49011
499-SUPPL	*See* PB-86-196102/XAB				11:49012
SLAC-					
300	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE86014070	MN -34D	11:49131
SLAC/AP-					
51	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013386	MN -28	11:48400
SLAC-CN-					
334	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014118	MN -28	11:48401
SLAC-PUB-					
3935	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014469	MN -28	11:48361
3936	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013435	MN -28	11:48345
3940	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014650	MN -28	11:48402
3945	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013507	MN -28	11:48403
3965	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013438	MN -28	11:48362
3968	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86012045	MN -28	11:48614
3973	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86012961	MN -34D	11:49413
3977	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013508	MN -28	11:48363
3979	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014087	MN -28	11:48364
3980	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86012876	MN -28	11:48615
3981	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013441	MN -28	11:48346
3985	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014648	MN -34D	11:48347
4001	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86012939	MN -34D	11:49160
4008	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014649	MN -34D	11:49455
4013	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014471	MN -28	11:48348
4017	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014473	MN -28	11:48616
4020	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013434	MN -28	11:48617
4026	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014475	MN -34D	11:49132
4029	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014470	MN -34D	11:49161

Report Number	Availability Source	File Number		Distribution Category	Abstract Number
SLAC-TN-					
86-3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014388	MN -34D	11:49162
SPh-T-					
85-062	*See* CEA-CONF-7938		DE86750871	MN -34D	11:49170
SWRI-					
03-7442	*See* AD-A-167629/5/XAB				11:47901
TN-					
1991	*See* PB-86-202298/XAB				11:47482
TPR-NS-					
27-No.1	GPO*		TI85017984	ND -41	11:47739
TR-					
86-52	*See* PB-86-213972/XAB				11:47233
0086(6427-01) -1	*See* AD-A-167692/3/XAB				11:48958
TR-EL-					
82-4/ 82-11.42	NTIS, PC A02/MF A01		TI86901600	MN -11	11:48737
82-4/ 82-11.48	NTIS, PC A03/MF A01		TI86901607	MN -11	11:48738
82-4/ 82-11.51	NTIS, PC A02/MF A01		TI86901601	MN -11	11:48739
TRB/TRR-					
1049	*See* PB-86-205192/XAB				11:47870
UCID-					
19054	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014936	MN -38	11:49624
20234	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014403	MN -20d	11:49569
20680	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014098	MN -32	11:48284
20788	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014404	MN -37	11:48311
20795	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014433	MN -25	11:48004
20804	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014747	MN -2	11:48656
20808	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014748	MN -32	11:48223
20816	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013922	MN -4	11:48028
20824	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014749	MN -38	11:48285
20832	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014938	MN -38	11:47905
20834	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014750	MN -41	11:47740
20842	NTIS, PC A07/MF A01 (GPO Dep.)	E 1.99:	DE86015011	MN -38	11:48244
20846	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86015152	MN -34B	11:49456
UCLA/PPG-					
917	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014407	STD -20a	11:49498
UCRL-					
15715	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013902	MN -38	11:48293
15830	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014453	MN -37	11:48636
52000-86-4/ 5	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014244	STD -2	11:49576
53630	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86014752	MN -70	11:48948
53750	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE86015111	STD -21	11:49577
53751	NTIS, PC A05/MF A01 (GPO Dep.)	E 1.99:	DE86014751	MN -32	11:49625
92925-Rev.1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014429	MN -32	11:49626
93040	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86009895	MN -4	11:48324
93185	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86008164	MN -38	11:48294
93645	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86010975	MN -85	11:47287
93752	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013218	MN -28	11:48365
93757	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013222	MN -28	11:48366
94084	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013898	MN -20d	11:49578
94092	NTIS, PC A02; 3		DE86014446	MN -38	11:48224
94115	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013899	MN -20d	11:49579
94277	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014440	MN -32	11:49101
94281	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014435	MN -61A	11:48912
94282	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014437	MN -25	11:48295
94348	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014428	MN -21	11:48367
94377	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86009686	MN -32	11:49627
94405	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013025	MN -34C	11:49267
94446	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013021	MN -38	11:48245
94693	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013901	MN -20d	11:49580
94731	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014434	MN -93	11:48216
94759	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86013019	MN -28	11:48368
94764	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86012806	MN -34C	11:49235
94800	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013221	MN -34	11:49102
94815	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013023	MN -20b	11:49581
94855	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014447	MN -38	11:48312
94856	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014448	MN -38	11:48313
94857	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE86014439	MN -35	11:48652
UILU-ENG-					
86-1747	*See* DOE/ER/02383-0120	E 1.99:	DE86014662	MN -32	11:49612
UIUCDCS-R-					
86-1268	*See* DOE/ER/02383-0120	E 1.99:	DE86014662	MN -32	11:49612
UJV-					
7295-CH,T	NTIS (US Sales Only), PC A02/MF A01		DE86703154	MN -86	11:47281
USAAVSCOM-TR-					
86-C-4	*See* N-86-24818				11:47947
USAFSAM-TR-					
85-86	*See* AD-A-167959/6/XAB				11:48654
UT/CES-GR-					
5	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE86013323	MN -66	11:47447
UVA-					
527277/ NEEP84/ 102	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE86014861	MN -80	11:47650
WAPD-TM-					
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DE86703175	NAC—83-07
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DE86750852	FRNC-TH—2125
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DE86750857	EUR—9595
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DE86750865	LPC—84-30
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DE86750868	LPC—85-13

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DE86750869	CEA-CONF—7941
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DE86750871	CEA-CONF—7938
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DE86750874	SCPRI-RM—5-1985
DE86750875	SCPRI-RM—6-1985
DE86750876	CEA-CONF—7913
DE86750877	CNRS-CPT—85-P-1795
DE86750878	CNRS-CPT—85-P-1776
DE86752094	KU-HCOE-FL2-R—85-27
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DE86752547	BMFT-FB-T—86-008
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DE86752555	BMFT-FB-T—86-035
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DE86752558	BMFT-FB-T—86-036
DE86752559	BMFT-FB-T—86-025
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DE86752563	CONF-8406336—
DE86752564	NP—6752564
DE86752565	CONF-8511208—1
DE86752566	BMFT-FB-T—86-032
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DE86752569	INIS-mf—10175
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DE86752572	INIS-mf—9900
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DE86752577	INIS-mf—10202
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DE86752595	INIS-mf—10203
DE86752596	INIS-mf—10197
DE86752597	KFK—4023
DE86752598	KFK—4071
DE86752599	BMI—1985-087
DE86752600	Juel—2006
DE86752601	INIS-mf—10199
DE86752602	INIS-mf—10201
DE86752603	INIS-mf—10200
DE86752604	GSF—6/85
DE86752605	BMI—1985-098
DE86752606	MPI-PAE/Exp.El.—163
DE86752607	GSF—42/85
DE86752608	GSF—7/85
DE86752609	KFK—3966
DE86752610	BMI—1985-096
DE86752611	BMI—1985-092
DE86752612	GSF—26/85
DE86752673	BMFT-FB-T—86-027
DE86752674	FhG-W—8/85
DE86752675	DFVLR-FB—86-15
DE86752676	NP—6752676
DE86752842	IFP-RA—1985
DE86752843	FRNC-TH—2224
DE86752844	DGRST—81-D-0512
DE86753179	IFP—33-730
DE86770133	NP—6770133
DE86770134	NP—6770134
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DE86770139	NP—6770139
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DE86780481	INIS-mf—10172
DE86780482	NIRS-RSD—69
DE86901172	DOE-tr—6901172
DE86901526	ENEA-RT-TIB—86/5
DE86901559	RT/TIB—85/27
DE86901564	NMERDI—2-73-4633
DE86901565	NMRDI—2-73-4631
DE86901583	NMRDI—2-73-4220
TI85017984	TPR-NS—27-No.1
TI85901725	NUREG/CP—0065
TI85901760	GAO/RCED—85-115
TI86005151	CONF-860610—2
TI86007123	BNL-NUREG—37691
TI86007561	NUREG/CR—4503-Vol.1
TI86009873	NUREG/CR—3453
TI86010442	NUREG/CR—3262-Vol.2
TI86010876	NUREG/CR—4526
TI86012504	NUREG/CR—4255-Vol.3-No.1
TI86012565	DOE/EV/03333—T6
TI86012566	DOE/EV/03333—T8
TI86013165	SAND—84-1341
TI86013313	NUREG/CR—4657
TI86013388	NE-F—3-44-7-86
TI86013422	NE-F—3-43-7-86
TI86013424	NE-F—3-42-7-86
TI86013617	DOE/NASA—0005-3
TI86014238	NUREG/CR—4367-Rev.1
TI86014309	CONF-850504—Pt.1
TI86014374	HEDL—7591
TI86014487	CONF-860605—20
TI86752841	DRET—83-1328-DS-SR
TI86901539	NEANDC(J)—121/U
TI86901577	NUREG—1048-Suppl.6
TI86901578	NUREG—1220
TI86901586	NP—6901586
TI86901587	NEANDC(J)—120/U
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TI86901607	TR-EL—82-4/82-11.48
TI86901608	NUREG—0853-Suppl.6
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TI86901613	NUREG/CR—3585-Vol.2
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TI86920402	EPRI-EM—4568
TI86920406	EPRI-NP—4648
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TI86920430	EPRI-EM—4599-Vol.1
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P	Patent
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